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USSR

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CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 34

EAST EUROPE

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CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 34

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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A. General Treatment

USSR

PLANS REVEALED FOR SECOND PHASE OF THE SYSTEM OF SMALL COMPUTERS

Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 78 p 14

[Text] In the field of computer technology in the last few years a great deal of attention has been devoted to the development of small computers--compact machines featuring high productivity and a large volume of information. They are being used successfully to control complex measurement systems and technological equipment. For 4 years now, specialists from Hungary, Bulgaria, the GDR, Cuba, Poland, Romania, the Soviet Union, and Czechoslovakia have been conducting joint work on the creation of a system of small computers. This system, together with the unified system of general-purpose computers, or YeS EVM, will become the physical basis for automation of control and data processing in all spheres of the national economy of the cooperating socialist countries.

In the Soviet Union, a number of scientific research organizations under the Ministry of Instrument Building, Automation Equipment, and Control Systems [Minpribor] are engaged in the development of this series of small machines. According to Corresponding Member of the USSR Academy of Sciences B. N. Naumov, director of the Institute of Electronic Control Machines, and general designer of the system of small computers:

"The appearance of the new component basis which is being used in the small computers--large-scale integrated circuits--has made it possible to obtain sufficiently high technical characteristics. At the same time, the cost of such machines is comparatively low.

"The system of small computers includes a number of control computer complexes-- The SM-1, SM-2, SM-3, and SM-4--which have capacities up to 1 million operations per second, as well as an extensive collection of devices for input and output, external memory, display, interfacing with the controlled process, remote communications, and so on. In all, the first phase of the small computer system includes more than 70 devices, which make up a set of various functional blocks for building up multipurpose systems for such functions as the construction of automated management systems [ASU's] in scientific institutions and enterprises in various fields of the national economy.

"Qualitative changes in the composition and functions fulfilled by the equipment which links the computer with the controlled process in such ASU's will be effected with the help of so-called microprocessors. They will provide new capabilities for primary processing of incoming information, correction, programmed interrogation of sensors, output of controlling instructions to the actuating mechanisms, and much more.

"Last year scientific and industrial personnel in Bulgaria, Hungary, the GDR, Cuba, Poland, Romania, the Soviet Union, and Czechoslovakia completed a great deal of work on the creation of devices for the first phase of the electronic computers and conducted international testing of them. Production of the SM-1 and SM-3 basic processors for the first phase was begun last year, while the Sm-2 and SM-4 went into production this year. The production of peripheral units for these machines has been organized in the Soviet Union and other socialist countries.

"During the development and manufacturing of the second phase of the system of small computers, the creation of models which have a capacity of several million operations per second is envisaged. They will be used where it is necessary to assure the collection and processing of large-scale information flows or to solve complex problems for which the use of large general-purpose computers is not economically feasible. Such tasks might include, for example, processing the results of complex scientific research, testing complicated controlled objects, and implementing optimal control of high-speed processes.

"Here one must keep in mind that the small computers of the second phase of the system will be program compatible with the configurations already in existence and will be able to be used successfully in multimachine complexes. In order to resolve the problems of continuity of software and experience in the development of control systems it is proposed that special software be created to facilitate the process of transferring existing programs to the small computers.

"The peripheral equipment will be developed on the basis of new principles: laser printers, adaptive devices for reading text (including handwritten text), devices for speech input, and others.

"Indisputably, improvement and development of mathematical software will significantly expand the computational and operational capabilities of the small computers and this, in turn, will yield not only a savings in resources and time, but will also make the given machines available to practically all spheres of scientific and economic acitivity."

USSR UDC (62-52:65.015.13):62

A MINICOMPUTER-BASED SYSTEM FOR CONTROL OF A GROUP OF PROCESS INSTALLATIONS WITH HIGHER OPERATING STABILITY

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 66-70 manuscript received 6 Aug 75; after completion, 15 Feb 77

KOTEL'NIKOV, YURIY NIKOLAYEVICH, candidate in technical sciences (Moscow); KROCHEV, ANATOLIY MIKHAYLOVICH, engineer (Moscow); and BORODIN, VALERIY DMITRIYEVICH, engineer (Moscow)

[Abstract] Group control systems for process facilities suffer from too high relative costs, overramified communication channels and overspecific software. Operating stability--the capacity to function during failures and partial shutdowns--needs improvement. Control computers, communication channels linking computer and controlled object and peripheral storage units are most vulnerable as to noise immunity. The Integral-M control complex was developed to meet these difficulties. It combines a control center and peripherals mounted at the control objects or near them. The control center is a single or two control computers, an operator console and demountable displays. Elektronika-100/I (capacity 12 bits, speed 300, 000 operations per second and immediate-access memory 32 K) are the control computers. The input-output complex includes: a teleprinter, a tape punch and a photoreader. The software consists of the following: a set of tests; an assembler; a small operational system for a 4096-word memory; a large operational system for a 8192 to 32,768-word memory; a translator from FORTRAN; a translator from a specialized group control language KAUT; and a library of routines. Figures 1; references: 5 Russian.

USSR

"EXPRESS-SYSTEM" FOR ISSUING TRAIN TICKETS CAUSES MORE PROBLEMS

Moscow PRAVDA in Russian ("The Blank Number") 4 May 78 p 3

BYSTROVA, Z., "Pravda" correspondent

[Text] (Comment by P. Zaytseva, Yaroslavl') I was getting ready to go visit my daughter. Ten days before my departure, I had paid for a seat in the reserved seat car and the service commissions, and had received a ticket, but without a train number. I was instructed to come back again in a week, having been forewarned that in order to get the ticket punched I would probably have to go to Moscow anyway. They say that now all the offices work according to some automated system. So, you see, the machine had not given me a seat. No one could say whether I would be able to leave Moscow immediately or whether I would have to wait. So what kind of a system is this?!

This concerns the "Express-System" introduced by the Ministry of Railways. Its purpose is to speed up the processing of information using an electronic computer and to improve service for commuters. Only no matter how "intelligent" the machine might be, people compile its programs; and here, we will frankly say, everything is far from being perfect.

If we consider Yaroslavl', the operation of its advance booking offices through the new system has added trouble and unpleasantness for railroad travelers. The stream of refusals and ticket returns has grown, along with, consequently, a flow of complaints. In the beginning, almost half of the orders remained uncompleted. Months have passed, and the situation is changing extremely slowly.

In 1977, up to fifteen percent of the passengers who came to the Yaroslavl' advance booking office were not able to depart at the indicated time. Every eighth person wishing to buy a ticket in advance for the return train did not get one. A new term even appeared among railway travelers: the "refusal under review."

The situation is becoming a curious one. You go to a ticket office and pay for a "blank number"--a blank ticket form. However, it does not at all guarantee your departure on the indicated day. You have to wait and see what the computer issues. If there is a seat, you will go. If not, it is possible you still might go...to the office of some Moscow station, where other such "service sufferers" are gathering in the hopes of getting that long-awaited ticket punched.

Every now and then battles flare up at the ticket offices. Sometimes a mean word is even directed toward the computer, which in general is totally innocent. The machine is impartial and conscientious and operates only with the information that it is fed. For example, it had not been programmed for company trains; and no matter how much passengers from this same Yaroslavl' pleaded, for the whole summer season not once did it issue a seat on the fast, comfortable"Ritsa" or "Kavkaz".

It is not rare now for Yaroslavites who want to obtain a desired ticket to go ahead of time for it to the capital. V. Chekunova, a passenger on the Moscow-Volgograd fast train, related that she did exactly that, having failed to come up with a ticket in her home city. For two weeks she had been offered a ticket, not for the day of her anticipated departure, but at a much later time and for an upper side berth. But up to Volgograd itself, she says, the sleeping compartment was half empty.

Over this past year Northern railway passengers "who have not gone" have returned a thousand tickets because their requests were not met.

Thus, one can understand those who take pen in hand to write these kinds of notes in the complaint book: "Does it not strike the workers of the Main Passenger Administration of MPS (the Ministry of Railways) that the sale of

tickets without a guarantee of traveling to our destination, and the absence of the possibility to obtain what one desires places the existence of such a service under question?"

C. Production Plants

USSR

ISKRA-310 TOTALIZER-CHECKWRITER PASSES TESTS IN KURSK PLANT

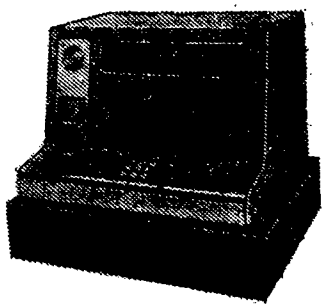
Moscow SOVETSKAYA TORGOVLYA in Russian ("Iskra-310: Speed and Accuracy") 11 Mar 78 p 2

ZDOBNOV, V., deputy department head, Technical Administration, USSR Ministry of Trade

[Text] The Iskra-310 electronic machine passed its tests at the Schetmash Plant in Kursk. The interdepartmental commission recommended it for series production.

The electronic Iskra-310 is a complex calculating-totalizing and check-printing machine, consisting of a large number of integrated microcircuits, semiconductor devices, ferrite cores and high-precision parts. It is designed for mechanization and automation of cash transactions at commercial enterprises. The Iskra-310 can serve nine sections or departments.

Featuring all the pluses of its predecessor--the Iskra-302A EKRM [electronic control-recording machine] the new machine has several major advantages. Its keyboard, made up of three miniature key fields, is positioned much lower and more conveniently for operators. The ink ribbon cartridge in the machine was replaced with an inking roller; this avoids the awkward step of reinking.



The machine's memory stores data in cash registers even if for some reason the machine is disconnected from the power supply.

Light and audible signaling indicates when the control or check tape is broken or used up; when this happens, the machine shuts off automatically. The new design of the printer increases the printing rate to 2.5 lines a second. The machine became more compact; its weight was somewhat reduced.

In 1978 a trial batch of Iskra-310 electronic machines is scheduled for production.

USSR

PARTS FOR INDUSTRIAL ROBOTS PRODUCED AT LEMZ

Leningrad LENINGRADSKAYA PRAVDA in Russian ("This Robot Is a Workhorse") 7 Apr 78 p 2

DAVYDOV, S.

[Abstract] Since the beginning of the year, the "Leningrad Electromechanical" Plant [LEMZ] Association has increased its monthly output of general-purpose numerical program control devices by a factor of 3.5. In addition, a consignment of 12 instruments developed by specialists of the Association, with the assistance of the Special Design Bureau of Technical Cybernetics of the Polytechnical Institute imeni M. I. Kalinin, are being sent to various machine-tool manufacturing enterprises.

Robots equipped with parts bearing the LEMZ trademark are capable of performing a complicated routine autonomously after only one "run-through" by the human operator. For example, a mechanical arm can grasp a half-finished article, align it properly, turn on the machine tool, remove the finished item, and finally package it, working at an untired, measured pace.

USSR

SM-1 CONTROL COMPUTER COMPLEXES IN PRODUCTION AT OREL PLANT

Moscow IZVESTIYA in Russian ("Sent To The Orderers") 4 May 78 p 1

POLUSHIN, I.

[Text] Orel--The Plant of Control Computers has begun production of a system of small fourth-generation computers, the SM-1 computer complexes. The complex is designated for control of technological processes in various branches of industry, especially in steel melting and metal rolling.

The first SM-1 complexes have been sent to customers in Kiev and Yaroslavl'.

USSR

"SM-1" COMPUTER COMPLEXES PRODUCED AT OREL PLANT FOR CONTROL COMPUTERS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("From The Small Family") 23 May 78 p 2

SKOROKHOD, V.

[Text] The collective of the Orel Plant for Control Computers has marked the third year of this Five-Year Plan by the output of the first five "SM-1" computer complexes. They are part of the system of small electronic computing machines and are intended for use in the control of technological processes in various branches of industry.

The first "SM-1" complexes have been sent to Kiev and Yaroslavl'. By the end of the year the enterprise's collective will have produced 150 such complexes for its consumers.

USSR

ROBOTS CONTROLLED BY M-5000 COMPUTER HELP MANUFACTURE COMPUTER PARTS

Moscow SEL'SKAYA ZHIZN' in Russian ("Robots in the Shop") 27 May 78 p 1

[Text] Vil'nyus. At the Vil'nyus Calculating Machines Plant--the chief enterprise of the "Sigma" Association--the first computer parts have come off a production line which is operated by robots. The robots, which are controlled by an M-5000 computer, have an output per shift which is almost double that formerly put out by the assembly section of the electronics shop.

The self-adjusting M-5000 complex, which is manufactured at this very same plant and distinguished by the State Mark of Quality, "dictates" the sequence of operations in accordance with the blueprints placed in it. It not only gives orders to the robots, but also determines for the shop a month in advance the list of components which are going to he assembled.

USSR

ISKRA KEYBOARD COMPUTERS ASSEMBLED BY CONVEYOR LINE

Moscow PRAVDA in Russian ("The Computers Are Coming Off a Conveyor")
28 May 78 p 2

VINOGRADOV, V., non-staff correspondent of PRAVDA

[Abstract] A system of conveyors for assembling the Iskra-210 and Iskra-1103 keyboard computers has been put into operation in a sector of the "Schetmash" Plant, part of the "Elektromekhanik" Production Association. The conveyors were installed and modernized by "Schetmash" specialists and are expected to yield an annual savings of 43,000 rubles. Use of the conveyor system to assemble the above-mentioned Iskra models has increased labor productivity, reduced losses of work time, and improved the quality of the products. In addition, 35 workers have been released.

D. Unified System or Ryad Series

USSR

YeS-1035 COMPUTER DESIGNS FUTURE COMPUTERS

Minsk SOVETSKAYA BELORUSSIYA in Russian ("Machine Designs Machine")
12 May 78 p 2

[Extract] The YeS-1035 computer, created at the Minsk Scientific Research Institute by Belorussian and Bulgarian specialists, is capable of solving a wide range of scientific and technical, economical, information-logic and other problems. The first machine in the second line of the unified system of computers, it represents a great new step in the development of computer technology. The YeS-1035 series is being produced at the Minsk Plant imeni Ordzhonikidze, and the institute's collective is working on the development of new and more contemporary machines with greater capabilities. It is remarkable that more than half of the design documentation for future computers will be prepared by the YeS-1035. The basic construction materials of the new machine are highly reliable circuits, and its electronic "brain" is capable of completing millions of operations per second.

USSR

MULTIPLE-USER COMPUTER CENTER

Ashkhabad TURKMENSKAYA ISKRA in Russian ("The Computer Aids Gas Workers")
21 May 78 p 4

MAMEDOVA, N.

[Text] A multiple-user computer center has been created at the All-Union Industrial Association "Gazprom." It is supplied with the most contemporary complex technical equipment and the YeS-1022 electronic computer.

The utilization of an electronic computer of this type significantly raises the level of automation and effectiveness of information processing. The new computer center will serve all enterprises of the republic's gas industry.

USSR

COMMENTARY ON "YeS 9003" COMPUTER COMPLEX

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("With All Consoles")
15 Jun 78 p 4

[Text] Bulgarian specialists have proposed that the unified system of electronic computers for socialist countries be supplemented with the "YeS 9003," a data processing complex utilizing magnetic tape. It has capabilities for input, correction, checking and initial information processing, and utilizes from 4 to 16 external operating consoles placed in various subdivisions of enterprises such as a large department store or motor pool. In addition to the small computer "IZOT 0310", the complex includes a memory on magnetic tape and magnetic disks, matrix, printer and control unit with operator console, and repeated input with subsequent comparison and correction of mistakes--with the aid of the keyboard on the operator console.

USSR UDC 518.747

CONTROLLED VIRTUAL MEMORY

Moscow PROGRAMMIROVANIYE in Russian No 1, Jan-Feb 1977 pp 28-36
manuscript received 30 Sep 76

KONOVALOV, N. A., KRYUKOV, V. A. and LYUBINSKIY, E. Z.

[Abstract] Problems are considered which are concerned with the use in programs of a computer's auxiliary memory. It is shown that virtual addressing makes it possible with ease to organize work with such an auxiliary memory. Various methods of control of virtual memory are studied as well as the organization of controlled virtual memory in ALGOL and FORTRAN languages for the BESM-6 electronic computer. Work on organization of controlled virtual memory for the BESM06 was started at the Institute of Applied Mathematics in 1975. Because translators from ALGOL and FORTRAN languages developed at the Institute operated according to a two-stage scheme with use of the intermediate language ALMO, a modification of only one translator from the ALMO language was used. The first problems using virtual memory were solved in March 1976. References: 2 Russian.

USSR UDC 576.131.2:681.3.1

CORE OF THE OPERATING SYSTEM OF THE ELEKTRONIKA K-200 CONTROL COMPUTER

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77
pp 41-44 manuscript received 9 Mar 77

DOLGOPOLOV, ALEKSANDR SERGYEVICH, senior engineer, Pskov Radio Components Plant (Pskov) and TOPOL'SKAYA, LYUBOV' VASIL'YEVNA, engineer, Special Design Office, Pskov Radio Components Plant (Pskov)

[Abstract] Most control information in the operating systems of control minicomputers is directed to storage buffers of the program status vectors and to control interchange with peripherals. The first category of control information is proportional to the depth of interrupt in the operating system; the second--to the number of peripherals servicing the operating system. Four interrupt levels are in this system. The top, zero, level is the computer failure level; next, the first level--the time interrupt level; the second--the level of peripheral interchange interrupt; and the bottom, the working task interrupt level. Design decisions yielded an operating system with the following characteristics: 25 groups of peripherals (up to 128 peripherals per group); 22 working tasks and one rush task handled at the same time; peripherals serviced include: magnetic disk stores, magnetic tape stores, teletypes; Konsul electric typewriter; photoreaders; tape punches and Videotron-340; there are four open files. The storage units include a 4 K permanent storage and an 0.26 K immediate-access storage unit. Figures 1; references: 3 Russian.

CZECHOSLOVAKIA UDC 681.32

DESIGN OF MICROCOMPUTER WITH MICROPROCESSORS INTEL MCS 8 AND MCS 80 (II).

Prague AUTOMATIZACE in Czech Vol 20, No 5, May 77 pp 121-125

KRSIAK, IVAN; BERAN, VOJTECH; KONDR, JAN. Research Institute for Machining and Machine Tools, Prague

[Abstract] The article deals with the design of microcomputers with microprocessors 8008 and 8080 of the US firm Intel. Intel now offers even more advanced microprocessors, the 8748/8048 and 8085. The type 8748/8048 lies in its design between the four-byte calculator chips and the high output eight-byte multichip microprocessor units. This microprocessor incorporates a CPU, electrical (8748) or mechanical (8048) programmed fixed memory with a capacity of 8 K bytes, which in the 8748 version can be erased by ultraviolet light, a memory of the RAM type with a capacity of 64 x 9 bytes, three eight byte inlet and outlet connections. The unit is designed for the control of recording cash registers and printing machines. Microprocessor 8085 represents an improved 8080 type, operating at + 5V; the CPU is located in the same casing as the clock generator and the system controller. Additional memory circuits and time circuits are available, so that the unit could be connected to the multiplex collector 8085. The software developed for the type 8080 is fully suitable for the 8085 type. The two types are fully compatible also for mechanical code instructions. Figures 6; references 5: 1 Czech, 4 Western.

EAST GERMANY

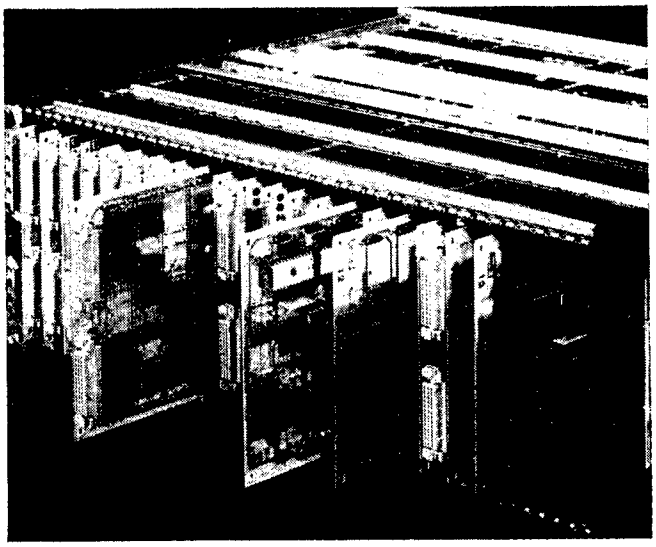
THE ROBOTRON K1510 MICROCOMPUTER SYSTEM

East Berlin MESSEN STEUERN REGELN in German Vol 20, No 12, Dec 77 pp 671-675

DAWIDCZAK, S. and WEISE, K. D., graduate engineers, Research and Engineering Center, Robotron State Enterprise, Dresden

[Abstract] Robotron State Enterprise exhibited at the 1977 Leipzig Spring Fair the Robotron K1510 microcomputer system and the Robotron ZE1 microcomputer, and their use in the programmable screen terminal 4000 and programmable minicomputer Robotron K1001. The K1510 microcomputer is the basic unit of the system which consists of a number of modular units; the K2511 central processor unit (consisting of the U808D computer circuit; the timing-pulse generator; the adapter circuit for the bidirectional data bus of the U808D to TTL logic; the register for storing the information output by the U808D in a time-multiplex manner; address coding to decipher the memory and I/O addresses; address expansion to double the number of I/O addresses; control unit providing the control signals for the central processor unit, memory, and connected controls; interrupt control to issue an

interrupt signal to the central processor circuit and priority entry of an interrupt command; and masking to prevent the entry of an interrupt message), the K2011 central processor attachment expand the inherent performance of the central processor unit interrupt organization (contains a plug-in unit with basement memory of 32 bytes to save the contents of the command counter, battery, a universal register, and the condition bit during an interrupt, so that the program may then transfer other universal registers in the operative memory), the K7612 control console, the solid-state memory (up to 16 K byte PROM/ROM and RAM units, K3810 programmable, up to 256 byte RAM, memory, K3510 operative memory), connection control K8510 for teletype, connection control K6010 for perforated tape units (such as DARO 1210 reader and DARO 1215 perforator), connection controls K9210 and K9211 for laboratory and measuring instruments (through SI 1.2 standard interface at TTL level), connection control K8511 to couple a supraordinate computer system through the interface S2 (meeting CCITT standards), the K7610 alphanumeric keyboard (with connection control K7610), screen display K7210 (31 cm, 8 lines with 32 characters each, with connection control K7010), the real-time clock K2012, the digital input K9212 and digital output L9213 (to transmit bit patterns in TTL level), plus power supply, protector, and similar units. The configurability of the K1510 computer and the structure of the system are described. The system documentation (host-computer MOS, basic MOS, and so forth) is briefly presented. Application possibilities of the system are wide. Figures 3; tables 2; references: 20 German



The photograph illustrates the K0112 component assembly. It and the K0111 component assembly (480 and 440 mm wide, respectively) accommodate the modular units which are standard EGS or IEC size, respectively. Either may accommodate up to 26 units, except the power supply, which is housed separately.

USSR UDC 681.325.2.02

PRINCIPLES OF CONSTRUCTING "MEMORY-RETRIEVAL SYSTEM" PROCESSORS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 58-62 manuscript received 12 Jul 76

KOLUBAY, STANISLAV KONSTANTINOVICH, senior assistant, KhIRE [Khar'kov Electronics Institute] (Khar'kov) and MURASHKO, A. G.

[Abstract] A better match between memory operating speed and operational unit speed can come from "memory-retrieval system" processors. This processor is capable of executing some set of operations on initial data by retrieving the result from memory; the processor consists of a memory storing all possible results of operations and a system for retrieving results based on initial data. Three processor versions are evaluated: a processor with logarithmic organization of memory; a general-purpose processor with logarithmic organization of memory; and a processor with "direct" organization of memory. The first-named processor has two memory fields (modules)--Pamyat' 1 and Pamyat' 2; its retrieval system consists of two decoders, as well as an adder. The second processor version is general in purpose: it can add, subtract, divide, multiply, raise to powers and take roots. Microprograms stored in a microprogram store handle these operations. The third processor version essentially stores the results of a given operation on input numbers A and B at the address fixed by the combined code AB. Magnetic domain-based memories are suggested as leading to a memory capacity of several megabytes in a volume not more than 6.5 cm^3 and an access time of some hundreds of nanoseconds. Figures 4; references: 4 Russian.

USSR UDC 681.62:655.3.024

TECHNICAL POTENTIALITIES AND POSSIBLE APPLICATIONS OF INK JET PRINTING IN TERMINALS OF SHARED-TIME SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 88-93 manuscript received 4 Jan 77

PADALKA, VASILIY LUKICH, engineer, Special Design Office for Printing Machines (Kursk)

[Abstract] Keyborad printing terminals with speeds from 10 to 60 characters/sec are in wide use in foreign shared-time computer networks. Also in extensive use are graphic terminals incorporating series printers with speeds from 10 to 60 characters/sec or drum printers at speeds of 50 to 1250 lines/min. Refinements in channel multiplexers quicken the demand for printers

that are much faster. Speeds of 60-120 characters/sec are most likely attainable with nonimpact printers: ink jet, ferrographic, thermal and other forms of printing. Nonimpact printers also include electrostatic and jet-stencil equipment with impressive speed capability (1000 or more characters/sec). The main component of an ink jet printing system is the emitter: it has an orifice 0.05-0.1 mm in diameter. Droplets must be uniform in size and their repetition frequency rate and speed must be constant. Droplet size is conditioned by ink viscosity, nozzle diameter, surface tension, power of exciting pulse and so on. The droplets are usually 0.1-0.2 mm in size. The emission of the droplet jet can be executed by four methods: an axial electrostatic field; pulsating pressure in ink supply tank; high constant pressure with synchronized breakup of jet by the exciting factor; and high pressure and electrostatic modulation of jet. Swedish press reports tell of a three-color--red, yellow and blue--ink jet system, computer-controlled, for cartographic use, at a modulation frequency of 100 kHz. Figures 6; tables 1; references 8: 3 Russian; 5 Western.

USSR UDC 621.373.826:722.99

HOLOGRAPHIC STORAGE DEVICES WITH INFORMATION SEARCH FUNCTIONS

Novosibirsk AVTOMETRIYA in Russian No 5, Sep/Oct 77 pp 37-51 manuscript received 27 May 77

GIBIN, I. S., GOFMAN, M. A., KIBIREV, S. F., PEN, YE. F. and TVERDOKHLEB, P. YE., Novosibirsk

[Abstract] Equipment embodying a model of associative optical storage devices with a two-level memory organization is described. The storage devices are searched by comparing the inquiry word with the contents of the tag memory cells. This involves computing a multidimensional (in terms of cell number) proximity functional, followed by decision-making. Specifically, hologram storage devices are described that permits selecting from the memory module any combination of pages of information from 10^3-10^4 or more pages stored. The selected pages are transferred to the plane of a photomatrix, summed, then processed in parallel, followed by storage of intermediate results according to multistep search algorithms. One part of the study systematizes model search problems in terms of sets of numeric tags, giving solution algorithms as applied to holographic storage devices. Part two proposes arrangements of tag holographic storage devices for accomodating complex paging kinds of search in terms of sets of tags. Tag-based holographic storage devices are more efficient than present computers by two to three orders of magnitude, because the short search time results from pagewise storage, reconstruction and processing of information. Figures 7; tables 2; references 10: 8 Russian, 2 Western.

USSR

UDC 621.378.324:681.142.659

EXPERIMENTAL STUDIES OF HOLOGRAPHIC STORAGE DEVICE USING INJECTION LASERS

Novosibirsk AVTOMETRIYA in Russian No 5, Sep/Oct 77 pp 52-56 manuscript received 19 May 77

BOBRINEV, V. I., VOROB'YEV, V. S., KAGAN, YU. KH., MAYORCHUK, M. A., MIKAELYAN, A. L. and NIFONTOV, N. B.

[Abstract] Using a matrix of semiconductor injection lasers is one way of miniaturizing high-speed holographic storage devices. An experimental storage device was built for the study of injection laser matrix characteristics. As to optics, the device consisted of a matrix of lasers, a lens raster, a matrix of holograms and a matrix of photodetectors. Each laser matrix has nine laser diodes simulating the central and outermost elements of a multielement laser matrix. The pulsed radiation power of the lasers was 150 mW at a pulse repetition frequency of 500 kHz. The lens matrix serves to transform laser radiation into parallel light beams to illuminate the holograms. Each hologram of the hologram matrix contained an overlay of 256 bits of binary information. The information spots were 100 microns in diameter; the spacing between spots was 600 microns. The information was read with a matrix of silicon photodetectors: each matrix element consists of a photodiode and a switchable diode, connected in opposition. The number of sensitive elements per matrix is 256, each 300 x 300 microns in size. Each matrix was a square, less than 10 mm on a side. Matrix element sensitivity was 10^{-12}-10^{-13} J. The switchable matrix of injection lasers has an information capacity of 10^{6}-10^{7} bits. The authors thank I. A. Frimer, M. A. Trishenkov, A. P. Chursin, A. Ye. Pronikov, T. G. Baronov, L. A. Karev and V. T. Demin for various kinds of assitance. Figures 5; references 4: 2 Russian, 2 Western.

USSR

UDC 681.325:621.378.9

RECORDING AND READING HOLOGRAMS AT DIFFERENT WAVELENGTHS IN A HOLOGRAPHIC STORAGE DEVICE

Novosibirsk AVTOMETRIYA in Russian No 5, Sep/Oct 77 pp 57-62 manuscript received 15 Oct 76

BOGACHEV, V. I., ZHDANOV, A. A. and MOKEROV, V. G., Moscow

[Abstract] Requirements imposed on the optical system of a holographic storage device operating at two wavelengths are examined. Information recording and reading assemblies are calculated. Image distortions are examined that are due to reconstructing wavefronts from different holograms

at a wavelength different from the wavelength used in recording the hologram. An Industar-51 objective, f = 210 mm, provided the initial data. The working overlay was 22.5x22.5 mm^2 in size; each bit was 200 microns; spacing between bits was 500 microns. The holograms were recorded with an He-Ne laser (model LG-36A) with wavelength 0.6328 microns; holograms were read at two wavelengths: 0.6328 and 0.44 microns (with an He-Cd laser, model LG-31). The maximum image shift in passing from the central to the outermost hologram was 20 microns at the wavelength 0.6328 microns; at the wavelength 0.44 microns, the maximum image shift was 50 microns. Chromatic aberration in the Industar-51 objective lens was the reason for the increase in image shift. Tables 2; figures 5; references 4: 2 Russian, 2 Western.

USSR UDC 002.5:681.327

OPTIMIZATION OF THE ALLOCATION OF MAGNETIC DISK FILES

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 10, 1977 pp 149-158
manuscript received 5 Jul 76

BORODKIN, A. M., BORODKIN, L. I., GURIN, N. N., KOGAN, YA. A., LYAPICHEVA, N. G. and MUCHNIK, I. B., Moscow

[Abstract] The optimal speed of external storage in multiprogramming computers comes from storage allocation that leads to the least overlapping of the request flow to different storage units. Nonuniform loading of storage units makes it more likely that a single unit will have two or more requests in a row. For example, two requests arriving in a row for different files on the same magnetic disk present a conflict. The quality of storage allocation on magnetic disks is judged by the total mean frequency of conflicts. For a given partition of a number of files served by a computer into n storage units, a criterion is derived for the total frequency of conflicts. The method was checked out on a moderate-sized third-generation computer with an operating speed of about 300,000 requests/second. Figures 1; tables 6; references 6: 5 Russian, 1 Western.

USSR

ELECTRONIC COMPUTER EXHIBIT AT LEIPZIG FAIR

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Robotron' Proposes")
4 May 78 p 4

[Text] At the beginning of this year two of the GDR's largest enterprises--"Robotron" and Tsentronik," which produce computers and office equipment, were merged into one plant--"Robotron." This merger allowed the improvement of production control and the more complete use of the achievements of scientific and technical progress. It now appears that the combined organization, comprised of 19 enterprises and 60 thousand workers, is not only the republic's largest association, but one of the world's largest as well. At the Leipzig Fair it was represented by more than 80 exhibits--the unified system of electronic computers of socialist countries, microcomputers, machines for information collection, bookkeeping equipment, typewriters, drafting devices, and office machinery. Now "Robotron" will produce more than three billion makes of manufactured articles per year, more than two-thirds of the goods intended for export to more than 50 countries.

"The USSR is our main consumer", said the head of a department of the Association, Gerhard Pampel. "But other socialist countries as well constitute a significant percentage of our consumer population. And, while we are simply trading with capitalist countries, we have a fruitful and creative union with socialist countries. The result of this union has been the creation of the unified system of computer technology."

On the basis of this agreement among the socialist countries in the fields of development, production and application of contemporary equipment for electronic data processing, third-generation computer systems are created.

"All these computers are general-purpose," said Gerhard Pampel. "In other words, they can serve essentially all disciplines--industry, transportation, and agriculture. For example, the system "1040," put out by "Robotron," successfully controls the Leningrad seaport."

"And what new things have you developed for this exhibit"?

"One of the innovations is the "YeS-1055" computer, which we created jointly with Soviet colleagues."

"This machine is significantly different from its predecessors. The computer occupies one-third less space and requires half as much energy, but its productivity is 1.6 times that of the former. It is supplied with virtual memory, the volume of which is 8 times larger than that of its most capable predecessors. Still another new aspect of this computer is an error correcting unit. During its operation the machine itself "catches" mistakes and eliminates them."

"Besides this machine, we are offering many other products to our consumers," continued my companion. "Included are new or significantly improved minicomputers and household appliances--portable television sets, transistors, and radiotelephone devices."

During the exhibit, agreements for 1978-1979 were concluded between the Soviet Foreign Trade Association "Elektronorgtekhnika" and the "Robotron" National Enterprise concerning the mutual supplying of equipment and devices for the technology of electronic data processing and the mechanization and automation of administrative work for the sum of 160 million rubles.

USSR

MICROCOMPUTERS TO BE USED IN DIGITAL CONTROL UNITS IN LENINGRAD

Moscow IZVESTIYA in Russian ("The Computer Will Control") 26 May 78 p 1

ALYUSHINSKIY, V.

[Text] Leningrad specialists have decided to use unique heavy assemblages and machine tools of the "processing center" type for microcomputers for digital program control.

"Our collective has completed the development of technical requirements for all new control system units", says the department head for the Special Design Bureau for Unique and Heavy Machine Tools, Ye. Petkunov. "Miniature electronic computers will aid the control unit. It is capable of 250,000 operations per second, and up to 30,000 commands may be stored in its memory."

Utilization of these innovations will bring many marvels. For example, at this time the writing of programs for such complex devices as propeller screws or blades, requires several kilometers of punched tape or magnetic film. Microcomputers will allow immediate "input" of all the control program into electronic memory.

USSR

EL'BRUS-2 MULTIPROCESSOR COMPLEXES IN PRODUCTION

Minsk SOVETSKAYA BELORUSSIYA in Russian ("New Computer Complex") 9 Apr 78 p 3

[Text] Production of the El'brus-2 general-purpose fourth-generation multiprocessor computer complexes has begun in the Soviet Union. Their overall capacity is more than 100 million operations per second and in speed they are superior to such modern general-purpose computers as the B-7700 (from the Burroughs Firm), the Univac 1100/92 (the Sperry-Univac Firm), and the IBM 370/195 (IBM).

The El'brus-2 is made from large-scale integrated circuits and precision-type multilayer boards. It employs an original cooling system. Automated design methods were used extensively in the development of the complex.

The El'brus-2 computer complex is intended for operation in major computer centers and collective-use networks.

Development of even more highly productive general-purpose computer complexes is currently under way in the Soviet Union.

USSR

UDC 681.3.06:519.2:65

PROGRAM PACKAGE EXPANDING THE POSSIBILITIES OF SOFTWARE OF THE BASIC M6000 CONTROL SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 28-30 manuscript received 14 Feb 77

KOROSTIL', YURIY MIROSLAVOVICH, engineer, All-Union Institute of Welding (Kiev) and TSYGANKOV, YURIY KONSTANTINOVICH, engineer, All-Union Institute of Welding (Kiev)

[Abstract] A program package is proposed for overcoming difficulties in accommodating a M6000 control system to nonstandard peripherals and to the complex organization of computational processes. The package is modular; one module organizes the processing of inquiries of peripherals in servicing; another module organizes the computational process; a third module serves to achieve dynamic standby status for the storage unit. All modules are designed as interchangeable programs and are written in MNEMOKOD assembler language. Software oriented to programming tasks handled in real time is currently available. The module organizing the processing of inquiries of peripherals does so in accordance with the inquiry queue number. This module can change inquiry priorities during the run of a user program. It also permits analysis of inquiry status at any given moment. The computational organizing module organizes the multiprogramming computational process by branch generation. This module initiates and terminates branches during system operation and generates them before start up of the system for computations. The module monitors branch completion and synchronizes branch execution with an event analyzer. It also changes branch priorities during system operation. The dynamic stand by memory module enables the user, when running user programs, to occupy--near the file in formation--unoccupied memory cells of the operational storage unit or to vacate earlier-occupied cells. The program package composed of these modules is aimed at developed operational systems of large computers. References: 1 Russian.

USSR UDC 003.62:681.3.06./97.2

SKIM-1: A LANGUAGE FOR SYMBOLIC CODING OF MICROCIRCUIT TESTS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 94-99 manuscript received 28 Jan 76, after completion 7 Feb 77

KONDRAT'YEV, VYACHESLAV VASIL'YEVICH, dr in technical sciences, Gor'kiy Polytechnical Institute imeni A. A. Zhdanov (Gor'kiy) and RESHETOV, MIKHALI VIKTUROVICH, engineer, Central Scientific-Research Institute for Technology and Organization of Industry (Gor'kiy)

[Abstract] A language for the symbolic coding of microcircuit tests, SKIM-1 is described. It serves in writing operating check programs for dynamic and static tests of microcircuits. Its symbols include Russian capital letters (except for the letters--transliterated as--Yo, Y, Ts, Sh, ", ', E, Yu and Ya), Arabic numerals, plus and minus signs and the separators: decimal point, comma, space, carriage return, equality sign and parentheses. The service symbols are made up of not more than three capital letters; they stand for devices that take care of control, device status, microcircuit leads, microcircuit parameters, operating check programs and its parts. They include: V--upper limit; VIZ--measurement time; VYV--microcircuit lead; GEN--oscillator; D--dynamics position feature; Z--delay; ZR--delay in propagation; IZV--measurement of time (dynamic) parameters; IZM--meter, static measurements; IST--source; KOM--commutation; KP--end of operating check program; KRP--housing; N--lower limit; NGR--load; NOR--norm; O--feedback; P--switching; PAR--parameter; POZ--position; POL--polarity; PR--reject limit; RPK--operating check program; SOP--resistance; XX--idle run. The principal and derived names of physical quantities are included in SKIM-1: (all in capitals) NS (nanosecond), A, MA, MKA (microampere), NA, V. MV, MKV (microvolt), OM (ohm), KOM and MOM. Figures 3; references 5: 3 Russian, 2 Western.

USSR UDC 658.5-50:371

PRINCIPLES IN CONSTRUCTING SOFTWARE FOR THE HIGHER SCHOOLS AUTOMATED INFORMATION SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 119-121 manuscript received 26 Feb 76; after completion, 17 Sep 76

GERASIMOV, VALENTIN MIKHAYLOVICH, engineer, Karaganda Polytechnical Institute (Karaganda) and POGORELOV, ANATULI MARTEM'YANOVICH, engineer, Karaganda Polytechnical Institute (Karaganda)

[Abstract] The automated information-retrieval system for higher educational establishments and higher schools described deals with statistical reports,

examination papers, enrollment registers, lists of student groups and so on. A modular scheme for the system is outlined: first-level module (input of initial data, sorting by specified keys, updating files and transfer from magnetic tape to magnetic tape); second-level module (functions not specified) and third-level module (two program complexes: one builds the data base; the other, applying the data base, answers arbitrary user inquiries). The latter module is in Minsk-32 computer macrolanguage. Figures 2; references: 2 Russian.

USSR UDC 681.3.06:51

SOFTWARE FOR AN AUTOMATIC CONTROL SYSTEM FOR EXPLORATORY DRILLING

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 124-127 manuscript received 28 Jun 76

CHEGOLIN, PETR MIKHAYLOVICH, dr in technical sciences, ITK [Institute of Technical Cybernetics], Academy of Sciences, BSSR; YARUSOV, ANATOLIY GRIGOR'YEVICH, candidate in technical sciences, ITK, AS BSSR (Minsk); YEFIMOV, YEVGENIY NIKOLAYEVICH, engineer, ITK, AS BSSR (Minsk)

[Abstract] Primary geologic information in exploratory drilling is now collected with an M6000 control computer complex. It includes: an M6000 processor, a 16 K immediate-access storage, punched tape input/output units, interfacers, an SID-100 data display station, a Konsul automatic typewriter and magnetic disk storage. The software contains five subsystems and a systems division: a systems scheduler and a real-time disk-based operational system. The subsystem linking the control computer complex with the controlled object reads data from the object sensors, subjects it to data reduction, then transmits control actions to the executive systems for automatic control of the drilling rig. The optimal control subsystem executes tasks in constructing mathematical models of the drilling process and optimizing and implementing optimal control. The emergency prediction and prevention subsystem contains programs started up by the system interfacing the controlled object with the control computer complex when monitored parameters overshoot permitted zones. The subsystem for operator interaction with the control computer complex employs an SID-1000 data display station for monitoring the characteristics of drilling and for inputting necessary data and updating material in the interactive mode. The subsystem for recording and documentation prints out on a Konsul typewriter the operator-computer interaction protocol and the indicators of the drilling process on user demand. Figures 1; references 3: 1 Russian, 2 Western.

USSR UDC 519.5

FIRST MONOGRAPHS ON THE THEORY OF FUZZY SETS

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 10, 1977 pp 182-184

AYZERMAN, M. A. and SMIRNOVA, I. M.

[Abstract] The book by A. Kaufmann, "Introduction to the Theory of Fuzzy Subsets, Volume 1: Fundamental Theoretical Elements," Academic Press, New York, 1975, is one of the first two monographic treatments of fuzzy sets to be published. The other monograph is the book by C. V. Negoita and D. A. Ralescu, "Applications of Fuzzy Sets to Systems Analysis," Birkhauser Verlag, Basel, 1975. The book by Kaufmann contains five chapters: chapter one introduces primary concepts, definitions and operations on fuzzy subsets. Chapter two, the longest, examines the properties of fuzzy relations and operations on these relations. Fuzzy logic is the subject of chapter three. Composition images of ordered pairs of fuzzy subsets are examined in chapter four. Chapter five generalizes fuzzy subsets and relates them to specific classic sets of objects exhibiting indeterminacy. By and large both of the books reviewed are undoubtedly useful and successful. However, it is possible to say that the book by Negoita and Ralescu is complete, laconic and undoubtedly useful and it would be most opportune to translate this book into Russian and to make it accessible to our readers.

USSR UDC 522.2

A RAPID HARTMANN METHOD FOR TESTING ASTRONOMICAL OPTICS

Moscow ASTRONOMICHESKIY ZHURNAL in Russian Vol 55, No 1, 1978 pp 180-185
manuscript received 19 Aug 76

VITRICHENKO, E. A. and KATAGAROV, F. K., Institute of Space Research, Academy of Sciences, USSR

[Abstract] A procedure is recommended for acceleration of the process of measurement in the stage of development of a part during which the basic errors of the surface are zonal in nature. The procedure is an automated version of the classical Hartmann method in which a picture is taken with the diaphragm fully opened, but only the coordinates of the points on the picture located at two mutually perpendicular diameters are measured. Two FORTRAN programs have been developed for the M-6000 computer, to study concave spherical and conoidal surfaces. Each of the programs includes a provision to report when the transition should be made to the full Hartmann method, utilizing all points on the picture. A further development of the

Hartmann method is automation of the entire process of measurement of the coordinates of the centers of bundles of rays on the photograph by means of an Optronics Fotomation device or other similar equipment allowing direct input of information from photograph to computer. This would allow the Hartmann method to be used in the manufacture of optical parts. Figures 2; references 3: 2 Russian, 1 Western.

HUNGARY

THE FORS DATA-PROCESSING PROGRAM GENERATOR

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 83-88
manuscript received 9 Nov 77

KARLI, GYULA, deputy department head SZAMKI [Computer Applications Research Institute]

[Abstract] The author describes the FORS (Free of Restriction System) input language for a program generator. It is an easy-to-use language permitting the continuous preparation of the programs representing a data-processing system. It includes a test-data generating program, and permits the storage and handling of various data structures (file and record specifications) for eliminating the need for extensive modification of the program for slightly different record systems. The program generator is equipped to assist the operator in identifying both syntactic and logical errors. A DFANOUT test program tests the programs prepared by the program generator. A DED (Data Element Dictionary) permits the storage and handling of every file and record description, which may be recalled any time. Every program written in the FORS language consists of declarations and decision tables (item-time and control-time decision tables). In the declaration we specify the variables of the program. Experience indicates that the FORS programs are easy to learn and use. The simplest programs were those using a single input file. Overall, a greater percentage of the programs of a data-processing system could be simplified considerably and prepared faster than with any high-level language. References 10: 2 Western, 8 Hungarian.

HUNGARY

STUDIES ON PROGRAMMING METHODOLOGY AT THE COMPUTER APPLICATIONS RESEARCH INSTITUTE (SZAMKI)

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 94-99

HAVASS, MIKLOS, senior scientific department head, SZAMKI

[Abstract] Completed, ongoing, and planned studies at the SZAMKI in the field of computer-aided program-solving approximations are briefly described. They include the following: implementation of the translation programs of existing program languages on small computers; implementation of existing programslanguages for system programs; data display and knowledge display methods (still ongoing); studies of the theory and practice of task decomposition and SAM (Structured Abstract Model); methods for examining the appropriateness of programs in various ways; and development of programs of

various sizes for facilitating the administrative part of the programming work. Future plans call for the integration of the part results obtained in the diverse studies, development of an interactive programming environment where complex (base or target) programs may be prepared, computer-aided preparation and implementation of enterprise management systems, autonomous problem solving beyond the procedures involved in the enterprise management systems, and preparation of the conversion of the results for expected next-generation equipment. A bibliography of the various studies is appended. References 38: 4 Western, 1 Czechoslovak, 33 Hungarian.

G. Automated Design and Engineering

USSR

AN ELECTRONIC COMPUTER AIDS THE DESIGNER

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 1, Jan 78 pp 22-24

BELEN'KIY, YU, candidate in technical sciences and YANOVICH, L., candidate in physico-mathematical sciences.

[Abstract] A computer network to be operated by the Academy of Sciences BSSR will provide access to BESM-6, ES-1050, and ES-1060 computers on a subscription basis. The new joint computational center of the "Belavtomaz" Association's Main Design Administration and the Institute of Mathematics, Academy of Sciences BSSR will provide mathematical and computational services to various subscribers involved in the design of new and the improvement of existing motor vehicles and tractor-trailer units.

Broader application of computer technology to motor vehicle design is necessitated by large work volumes and tight schedules.

Greater reliance on mathematical methods and computers during the design stage is urged in order to reduce costs and to counter the "psychological and production conservatism" that makes changes "extremely difficult" once an experimental model has been developed.

Modern computer technology was introduced in the main design office of the MAZ [Minsk Motor Vehicle Plant]in the early 1960s, and automation has progressed to the point where motor vehicle design is no longer "thinkable" without computers. MAZ was aided by the Institute of Mathematics of the BSSR Academy of Sciences, and the plant now has a scientific research laboratory staffed by specialists whose objectives include the further automation of the design process and increased utilization of computers.

Programs requiring relatively little computer power and storage are run on MIR minicomputers. These include programs designed to calculate the turning radius of tractor-trailer units and the effectiveness of different cooling systems and universal transmissions.

Programs requiring greater computer power are run on the ES-1030 of the Institute of Mathematics of the Academy of Sciences and on the Minsk-32 of the plant's Computation Center. These programs form the basis of motor vehicle design and include applications to examine the vibration of driver cabs, speed and fuel consumption, and required engine power and transmission parameters.

The thrust of the design strategy will be toward establishment of an industry-wide system of automated calculations (SAR) that will be made up of standardized calculation subsystems, such as mathematical models, algorithms and computational methods. This system is to supplant a multitude of diverse

methods and approaches now in use and is to lead to the development of a central "program bank." This will require creation of a special organization with authority to coordinate the activity and the elimination of organizational anomalies. Also needed will be modern computer technology and new staff specialists, including mathematicians, programmers, operators and maintenance personnel.

Although computers vastly increase design productivity, it does not necessarily follow that their introduction will automatically lead to reductions of the staff of the design services. The reason is that use of computers permits improvement of design quality and a wider range of attack on problems by permitting calculations and investigations that earlier could not be done at all or only in simplified form and therefore with less accuracy.

The role of computers in engineering-design activities will become still more effective with the future development of special design languages, with means of graphic input, and with expansion of the computers' mathematical repertoire by inclusion of such basic tools as descriptive geometry, theoretical mechanics, the strength of materials, and others.

The process of bringing computers into factories is viewed as part of the bigger process of the "industrialization of science" in the factory sector. In this process, the automation of computation is viewed as one of the most important tasks that to a large degree will determine technical standards, quality and efficiency.

USSR UDC 522.2

COMPUTER SIMULATION OF ASTRONOMICAL OPTICS

Moscow ASTRONOMICHESKIY ZHURNAL in Russian Vol 55, No 1, 1978 pp 168-179
manuscript received 27 Jul 76

TERTITSKIY, M. I., State Astronomical Institute imeni P. K. Shternberg

[Abstract] The first task in the design of a high-quality optical system consists in the achievement of a theoretical resolution which is near the diffraction limit given the (basically dimensional) limitations of the system. The complexity of the design of an optical system increases rapidly with increasing numbers of components (optical surfaces) and increasing requirements as to image quality. Planning of a large multipurpose telescope is a research task involving a tremendous number of computations. This article analyzes methods of planning of astronomical optics by a computer using man-machine dialogue methods. The sequence of calculations is as follows: calculation of image characteristics on the basis of the fixed initial values of parameters; simulation of shifting and

turning of the optical surfaces; variation of the free parameters of the optics; and optimization of the optical system. The aberrations are calculated and image spot diagrams constructed for each stage of the simulation. Prospects for expansion of the simulation system are discussed. These may include processing of data including the results of studies of the optics as they are manufactured or used. Figures 4; tables 8; references 5: 2 Russian, 3 Western.

USSR

MERITS OF AUTOMATED DESIGN SYSTEMS DISCUSSED

Kiev RABOCHAYA GAZETA in Russian ["Electronic Computer Makes Drawings"] 11 Jun 78, p 2

ZLOTOGURSKIY, Z., engineer, KievZNIIEP [Zonal Scientific-Research Design Institute for Standard and Experimental Design of Dwellings and Public Buildings]

[Text] An experimental center of automated design has been set up in Kiev on the base of the Zonal Scientific Research Design Institute for Standard and Experimental Design of Dwellings and Public Buildings.

Specialists know that one of the main contradictions in this field is between the rates of construction and the traditional inefficient methods of making drawings. Already now 80 per cent of construction and installation work is done and almost one-third of all dwellings are constructed by us with standard designs. It is clear that it is becoming more and more difficult to accomplish the entire volume of work. Therefore, full automation of design is the most efficient if not the only way out of this situation. What is intended here is not replacement of man by a computer, but rational use of the latest achievements in science and technology. For example, a task which took a highly qualified specialist 10 to 15 years ago can now be done by a technician with a computer.

A system of automated design (SAP) is capable of solving two problems: making the intermediate design documentation and sanitary and heat engineering estimates, and putting out the working drawings and estimates.

Setting up such automatic design centers is the first phase in the effort to improve methods of design. Today, the computer has already become an irreplaceable assistant to the design architect.

USSR UDC 681.3-192.001

PROBLEM OF RELIABILITY OF CONTROL COMPUTERS

Moscow AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 17-22 manuscript received 2 Dec 76

MITICHKIN, YE. N.

[Abstract] Control computer reliability cannot be gauged by customary characteristics of probability of failure-free operation, mean time of failure-free operation, etc. A method is formulated which centers on the concept that as computer components malfunction, the computer passes through a series of technical states, each differing in the number of functioning components. Each technical state has its own data processing possibilities. In processing data, too, the computer is in different data states differing in the number of computer components engaged in data processing, the number of requests in the queue and so on. Briefly, computer reliability is defined as the joint probability that, when the control computer is in a given technical state with a given number of functioning components, the data state of the computer with a given number of components processing data will match the technical state in terms of functioning components actually engaged in processing data within a given allowable percentage range, for a given residence time of the computer in the given technical state. References 3: 2 Russian, 1 Western.

USSR UDC 681.322.002.2

ELECTRONIC COMPUTER RELIABILITY IN SERVICING REQUEST FLOWS OF DIFFERENT ORIGINS

Moscow AVTOMATIKA I VYCHISLITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 26-28 manuscript received 19 Dec 76

SHUBINSKIY, I. B. and KULIKOV, V.A.

[Abstract] Estimating the reliability of single-processor third- or fourth-generation computers can be formulated as numerous distinct problems, depending on the number of request flows, servicing discipline, queue involvement, kind of monitoring of the computational process and so on. Computer reliability here is defined as the mean time between functional failures. The problem formulation specifies that request flows of different origins and of absolute priorities are handled by the computer. There is no queuing. This formulation accords with actual practice at computer centers and automatic control systems. A random process of servicing request flows is

postulated as a semi-Markovian process. Requests are handled as a series of processing states, shown as a transition graph, with random values ascribed to each node showing the possibility of leaving one state--after a random residence time-- to pass into another state of request handling, with a different random residence time. Distribution functions of the random time intervals between request handling are derived. Figures 1; references: 4 Russian.

USSR

TEST OF NEWLY DEVELOPED ROBOT

Moscow IZVESTIYA in Russian ("Robots Learn How to Work") 11 May 78 p 3

BLOKHNIN, A.

[Abstract] Experiments with a new robot whose two arms and hands are controlled by artificial intelligence have demonstrated the great potential value of such devices.

Named LPI [Leningrad Polytechnic Institute] -2, the robot has been developed at the Special Design Department of Technical Cybernetics of the Leningrad Polytechnic Institute. It can manipulate objects and sense their presence and movements by means of computer-controlled optical, television, and ultra-sound "eyes."

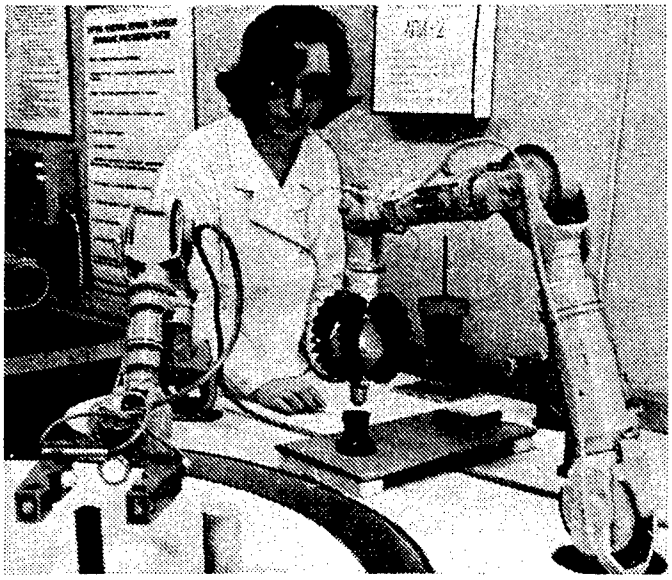
According to B. Avetikov, deputy chief of the special design department, use of robots can be expanded a thousandfold if they can be economically taught to see necessary details and objects, grasp them, and place them in designated places. However, the artificial intelligence needed for such performance can be very bulky and in some cases does, in fact, occupy as much as "two spacious rooms," according to Avetikov.

A robot's ability to adapt to changes in external conditions is achieved by means of sensors that enable the robot's "organs" to sense when its "hands" touch objects or devices, according to Professor YE. Yurevich, doctor of sciences and chief of the Special Design Department. Such adaptation, according to Dr. Yurevich, has tremendous practical significance because it will enable robots to replace people in dangerous industries, such as mining, and to enter as yet inaccessible places, such as ocean depths and other planets.

Tasks the LPI-2 robot can perform include: grasping objects of different shapes and placing them in designated spots; reaching for and grasping objects hidden behind obstacles; screwing light bulbs into receptacles with a minimum of breakage, and returning the squeeze of a human hand in proportion to the effort exerted by the human.

In follow-up work, scientists will switch from the use of individual robots to robotistic systems whose control algorithms are now being probed. 1 photograph.

Tests of LPI-2 Robot



USSR

LENINGRAD PLANTS COOPERATING TO PRODUCE INDUSTRIAL ROBOTS

Moscow IZVESTIYA in Russian ("On a Conveyor-Robots") 30 May 78 p 3

BLOKHNIN, A.

[Text] About 50 large Leningrad enterprises have joined a unique cooperative for the production of industrial robots.

Tens of models of robots, most of which were constructed right here in Leningrad, have been started in batch production. This "family" is meant for work with parts weighing from 250 kg to fractions of a gram.

It is especially important to note that the production of robot equipment is accomplished in Leningrad on principles of initiative, showing what great possibilities of supplementing the unified state plan exist in the field.

A small number of robots have already started servicing machine tools, presses and pressure-casting machines, helping people on assembling conveyors, painting parts and welding. In the machine parts stamping and mechanical working section of the Kirovskiy plant, 10 robots have released 26 persons. A program on which 240 workers previously worked is now being

carried out by 130 robots. Only operators have remained at the assembly tables. Labor productivity is now six or seven times as high.

For the direction of work on the production of robot equipment a coordination council has been formed which includes representatives of such large enterprises as "Elektrosila," "Arsenal" and "Pozitron" Production Association and the Leningrad Optical and Mechanical Association (LOMO). The leading organization is the Special Design Office of Technical Cybernetics of the Leningrad Polytechnic Institute.

The start of the practical introduction of robot equipment has revealed an important special feature: the general technical and organizational level of production is being sharply raised and the fashion has been set for engineering research.

II. ECONOMIC APPLICATIONS

A. General Treatment

HUNGARY

COMPUTER-ASSISTED ENTERPRISE MANAGEMENT IN PRACTICE

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 64-71
manuscript received 12 Nov 77

KRAJCSOVITS, MARTON, main scientific department head, SZAMKI [Computer Applications Research Institute]

[Abstract] The author reviews the accomplishments of the SZAMKI on the occasion of the institute's 10th anniversary, with special emphasis on computer applications developed for enterprises. The work was carried out in the following departments of the institute: Application Program Systems Department, Application Methodology Department, Operations Research Department, and Enterprise Applications Department. Of the total of 51 projects completed in this area, 5 concerned stock management, 3 concerned fixed-asset management, 3 concerned contract management, 4 concerned ordering procedures management, 4 concerned overall production scheduling, 9 concerned production accounting, 1 concerned the development of building-industry programs, 11 concerned general administration and analyses, and 11 were miscellaneous. The following subjects are discussed: computer-aided resource management, task-oriented program packets, method-oriented program packets, data base-oriented organization, computer-aided support of computerization, implementation of results, and future tasks (efficiency studies of computerization, introduction of 2d-generation ESER [Unified Computer Technology System] equipment, data-base generation and expansion, and introduction of an overall national management information system). Tables 2; figures 3; references 26: 6 Western, 20 Hungarian.

HUNGARY

ANALYSIS OF THE OPERATION OF COMPUTER-BASED SYSTEMS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 119-124
manuscript received 18 Nov 77

KOVACS, JANOS, deputy senior department head, and ADAMY, LASZLO, dr, Senior staff scientist, SZAMKI [Computer Applications Research Institute]

[Abstract] The authors describe a program system designed to facilitate the analysis of computer services for ESER [Unified Computer System] equipment. In the system, inputs are performance data, accounting vouchers, and the like; outputs are data characterizing the operation and performance of the system. The operation-analyzing program system consists of subsystems

involving in part individual programs, and in part program modules to be integrated to the program system providing the basic functions. The following subsystems are included: control subsystem (on-line checking of the validity of the jobs); data-collection subsystem (on-line and off-line data collection from various operating systems); evaluation subsystem (job-running and other costs based on resource utilization); data-bank subsystem (handling of informational, operational, and accounting data); and interrogation subsystem (preparation of scheduled and on-scheduled reports). Information is provided on four levels: for the operator, for the economic department of the organization, for the users, and for upper management. Figures 5; table 1; references 8: 4 Western, 4 Hungarian.

USSR

A SYSTEM APPROACH TO MANAGEMENT

Moscow NAUKA I ZHIZN' in Russian No 3, 1978 pp 6-10

[Interview with Doctor in Economic Sciences, B. MIL'NER, deputy director of the All-Union Scientific-Research Institute of System Research of the State Committee of the Council of Ministers of the USSR for Science and Technology and the Academy of Sciences of the USSR conducted by N. KUDRYASHOV, special correspondent of the magazine "Science and Life."]

[Abstract] The past decade has been the birth of entire new branches and sub-branches of Soviet industry, and this has greatly complicated communication and interaction in the national economy. It has also led to the formation of large,concentrated scientific-technical and production combines that consist of either like or related industries or of the resources required to reach the goals of complex projects requiring the effective utilization of many different resources. These developments have significantly changed both the volume and the nature of the information required for decision-making and have resulted in the inadequacy of existing management structures.

With both the nature and the scale of production changing, and with management required to assume an ever-greater interdisciplinary character, the largely intuitive management approaches of the past must be replaced with more precise and scientific management structures. Such structures can be defined by means of a "system approach to management."

In such an approach, logic and knowledge are combined with modern data-processing methods that augment human decision-making with complex modeling and permit comparison of calculations with results obtained by modeling a multitude of possible variations of a given process.

To be used effectively, however, the system approach to management requires the development of management structures that can implement the methodology. A number of conditions must be met for such a structure to be effective, and these conditions are listed.

Key shortcomings of current management structures are their failure to address long-range and strategic requirements (such as long-range research, development of a technical strategy, and elevation of the technical level of products) and failure to coordinate and integrate different product activities caused by inadequate communications and liaison between vertical management structures. To correct this deficiency, horizontal management structures must be added to form a matrix-like structure of management.

A chart showing the organization of the technical services of the KamAZ (assume: Kama Automobile Plant) is shown. It shows two parallel vertical organizational structures: one headed by a deputy general director for

research and development, the other by a technical director. Both report to the general director. The first (i.e., the strategic) organization includes a staff function for "System Research and Complex Prognoses," and both organizations are linked by a technical committee that reports to the general director. A similar organization is in place for the Uralelektrotyashmash (assume: Urals Heavy Electrical Machinery) Combine.

A detailed definition of the system approach to management is presented, and examples of Soviet industrial combines and complex programs requiring a system approach to management are given. Also presented are details on the volume of information required for annual planning to support the argument that excess of information is becoming as harmful as lack of information and that the answer to this information explosion lies not merely in automated processing of information but in reducing information to a level where it can be economically utilized.

USSR

GROWTH OF COMPUTER TECHNOLOGY IN ESTONIA

Tallin KOMMUNIST ESTONII in Russian ("On One Possibility for Improving the Automation of Data Processing") No 4, 1978 pp 64-69

IYYERYUYUT, I., candidate in economic sciences

[Excerpts] During the Ninth Five-Year Plan (1971-1975), the number of computers in the Estonian SSR increased by 3.5 times, and the number of computer centers by 2.8 times. At the beginning of this period the republic had slightly more than 500 specialists in computer technology (excluding maintenance personnel), but by the end of the period there were more than 1600.

The use of third-generation computers is growing; they already comprise one-third of the computers in the republic.

Numerous individual automated management systems [ASU's] are being designed and put into operation, and in addition, work is proceeding on the creation of a republic ASU for Estonia under the direction of the Scientific Research Laboratory of Economics and Planning, Gosplan Estonian SSR.

USSR

METHOD DEVELOPED FOR DETERMINING ECONOMIC EFFECTIVENESS OF ASUP'S

Moscow EKONOMICHESKAYA GAZETA in Russian ("In the Economist's Handbook") No 14, Apr 78 p 6

[Text] The State Committee of the Council of Ministers USSR for Science and Engineering [GKNT], USSR Gosplan and the USSR Academy of Sciences have approved "A Method for Determining the Economic Effectiveness of Automatic Management Systems for Enterprises and Industrial Associations" [ASUP]. The procedure and the specialized indication methods based on it are used in ministries, departments, associations and enterprises in sectional scientific research and planning institutes at all stages of ASUP development and adoption.

There are three parts to the method. Annual economic impact is shown in basic indicators which assess the economic efficiency of expenditures for ASUP development. During selection for investment of the variety of means, including ASUP development, conducive to increasing economic effectiveness and at the scientific research and experimental design work stage, estimates are produced according to the method which was approved by GKNT, USSR Gosplan, the Academy of Sciences and Goskomizobreteniy [State Committee on Inventions] on February 14, 1977 for evaluating the economic effectiveness of new equipment, invention and innovation use in the national economy.

The single standard ratio 0.15 is used in all of the estimates for the economic efficiency of capital investments. This ratio is used for determining the bonus yield of new equipment following the adoption of ASUP's.

The annual profit growth and the computed ratio of economic efficiency of capital investments (the period for reimbursement) appear as the profitability indicators of economic efficiency of the development and operation of ASUP's calculated at the point of adoption and use of the systems.

There are 12 appendixes to the method.

B. Bloc Cooperation

USSR

AUTOMATED CONTROL SYSTEM EXHIBITED AT BULGARIAN PRESENTATION IN MOSCOW

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("At The VDNKh SSSR--Bulgarian Electronics") 7 Jun 78 p 4

[Excerpt] An operations center of the unified system of electronic computers is on display in Moscow at the Exhibition of Achievements of the National Economy of the USSR (VDNKh SSSR) as part of the exhibit "Bulgaria is free; Bulgaria is restored." June 6 here was the Day of Electronics and Electrotechnical Industry of the Peoples Republic of Bulgaria.

"The electronic center," says S. Patov, an engineer at the Sofia Plant for Computer Equipment, "is the result of scientific and technical cooperation between the USSR, the GDR and Bulgaria. In practice an integrated socialist economy has materialized, the significance of which was again emphasized by the general secretary of the Central Committee of the CPSU and president of the Presidium of the Supreme Soviet, Comrade L. I. Brezhnev, at the time of the visit of the Soviet party-government delegation to the Czechoslovak Socialist Republic. Many inventions at the exhibit were developed jointly by Soviet and Bulgarian specialists, specifically an entire range of electronic and electrotechnical equipment used in the construction of the main gas, "Soyuz", the Vinnitsa-Al'bertirsha Power transmission line, the Ust'-Ilimskiy Cellulose Plant and other facilities.

Electronics and electrotechnology have become the leading branches of Bulgarian economics. The exhibit is a convincing witness of the achievements of a brother country in these important fields of industry.

HUNGARY

SUBSTANTIATION OF ECONOMIC-POLITICAL DECISIONS WITH THE AID OF COMPUTERS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 125-129
manuscript received 3 Jan 78

SZAKOLCZAI, Gyorgy, Dr, senior department head, SZAMKI [Computer Applications Research Institute]

[Abstract] The Main Econometrics Department of SZAMKI studies, among other items, ways for providing background information with the aid of a computer for economic-political decision-making. Some highlights of this activity are briefly discussed on the basis of published reports. At the present time, two major areas are investigated: (1) the use of so-called simultaneous econometric models for forecasting the general economic situation, foreign trade, and prices; (2) the use of sector-relationship balances and related models for forecasting and optimization. Static models for forecasting do not provide for various limiting and other factors, and thus produce forecasts of restricted value. In the area of price forecasting, the models are improved by including in the models the input-output technological coefficients and the finance-labor coefficients. As a result, we obtain a non-linear relationship between production and expenditure of money and labor. The principle of this expanded model may also be used for forecasting the need of economic measures (and in general the kind of measures), as well as for forecasting the course of the overall economic structure. The methods were developed for various ministries, where they are in part already used and in part under trial. References: 6 Hungarian.

D. Economic Control at Local Level

USSR UDC 65.011.56:62-52./14

AUTOMATED RAYON MANAGEMENT SYSTEM. START UP COMPLEX

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 104-112 manuscript received 7 Dec 77

GLUSHKOV, VIKTOR MIKHAYLOVICH, academician, Cybernetics Institute, Academy of Sciences UkrSSR (Kiev); OSHKO, VLADIMIR PETROVICH, 1st Secretary Municipal Committee, Communist Party of the Ukraine (Dnepropetrovsk); STOGNIY, ANATOLIY ALEKSANDROVICH, corresponding member, Academy of Sciences UkrSSR, Cybernetics Institute, Academy of Sciences, UksSSR (Kiev); MOSIN, VIKTOR DANILOVICH, Secretary, Leninskiy Rayon Committee, Communist Party of the Ukraine (Dnepropetrovsk); GROZITSKIY, GENNADIY MIKAYLOVICH, deputy chairman, Executive Committee, Leninskiy Rayon Council of Worker's Deputies (Dnepropetrovsk); KOZHURIN, FEDOR DMITREVICH, candidate in technical sciences, division of Special Design Office, MMS [?],Cybernetics Institute Academy of Sciences, UkrSSR (Dnepropetrovsk); and GOLAVANON, EDUARD KONSTANTINOVICH, engineer, division of Special Design Office, MMS [?] Cybernetics Institute, Academy of Sciences UkrSSR (Dnepropetrovsk).

[Abstract] The start up complex of an automated rayon management system [ASU-Rayon] handles the most significant and vital or rayon management tasks, furnishes the results of performing selected tasks at the uppermost level of rayon management (party rayon committee level and rayon executive committee level) and accounts for a large part of the social-economic effectiveness of the entire rayon automatic management system. The startup complex was developed for the Leninskiy district of Dnepropetrovsk and is also being introduced into the Moskovskiy district of Kiev, Boguslavskiy rayon of Kiyevskaya Oblast and other rayons of the country. The field computer center consists of two Minsk-32 computers and one Minsk-22 computer, an AGTS teletype, a six-compartment PTU-102M television set and other equipment. Maximum display coverage is 1152 characters (24 lines of 48 characters each). Automating the execution of tasks of monitoring and analyzing the economic activity of rayon or city district enterprises and organizations is prominent among the functions of the management complex. Other task categories include management of government and party activity and management of ideological work. Equipment used, scheduling, machine time, critical equipment link, gain in information volume and volume of information processed in bytes are tabulated by management task category. Figures 3; tables 1; references: 13 Russian.

USSR

COMPUTER USE INCREASES IN UZBEKISTAN

Tashkent EKONOMIKA I ZHIZN' in Russian ("The Positive Advance of Cybernetics") No 1, 1978 p 69

[Text] Our Twentieth century can legitimately be called not only the century of atomic energy and the conquest of outer space but also the century of cybernetics. Economic and mathematical methods implemented on computer equipment are being applied more widely all the time in the country's national economy as well as in that of Uzbekistan. The chief manager for development operations on the republic automatic management system (RASU), academician of the Uzbek SSR AN, V. K. Kabulov discusses this in the article.

Just ten years ago there were only three electronic computers [EVM] in Uzbekistan and only the first phase of the automatic production management system was functioning in the Tashkent aviation plant imeni V. P. Chkalov. Today we have 313 EVM's including 50 third generation machines, approximately 100 computer centers and 94 automatic management systems [ASU] of different levels.

The need for increasing the efficiency of ASU's and computer centers was stressed in the resolutions of the 25th KPSS Congress. Definite successes in this direction have been accomplished in our own republic. The annual economic output resulting from the adoption of ASU's amounts to 36 million rubles while expenditures for their development are being repaid on an average of about three years.

Uzbekistan is one of the first Union republics where work as a whole on the development of automatic management systems for the republic's economy has been expanded on a wide front.

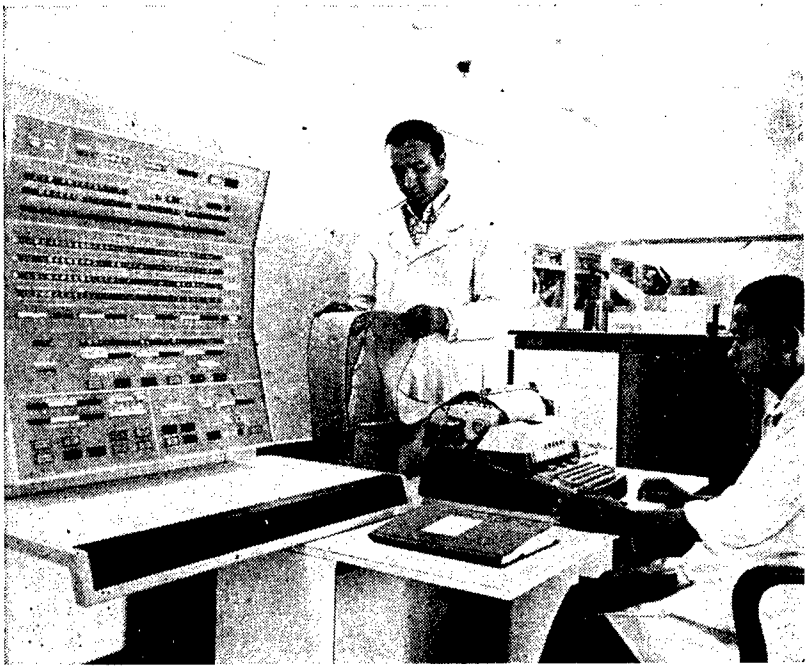
At the beginning of last year an interdepartmental board from USSR Gosplan, the State Committee of the USSR Council of Ministers for Science and Engineering, UzSSR Gosplan and the republic's Academy of Sciences put into operation the first phase of an automatic system for plan calculations (ASPR) for the Uzbek SSR Gosplan. While only 16 estimates were executed on EVM's in 1973 during the development of the national economic plan, there were 518 in 1977.

Large-scale specialized planning organizations for ASU development are functioning in the republic among which should be mentioned the Special Planning and Design Office [SPKB], Institute of Cybernetics with a computing center [VTs] of the Academy of Sciences UzbSSR, the Tashkent PKB-ASU and the branch "Sredazspetsavtomatika" [Central Asia Special Automatic Equipment] Association. Our scientists are making an important contribution to increasing management system efficiency. Algorithmic planning methods which make it possible to reduce the cost of developing systems and simplify their link-up and interface

are a new technology for ASU development which has been developed in the Cybernetics Institute.

In the current year, a large and exceptionally important operation began on the development of a network for communicating data to automatic management systems in the republic. The construction of one of the first collective use VTs's in the country is being started in Tashkent.

The more the problem is solved in the Uzbekistan economy by adopting economic and mathematical methods and computer equipment, the wider the horizon becomes and the more unsolved and complex problems we will see before us. Large and growing more so each year, the team of cyberneticists, including scientists, designers and skilled workers, is concentrating all of its attention and all of its efforts on them.



The machine room of the Data Computing Center of Uzbek SSR Gosplan. Machine supervisor N. Z. Muminov and senior operator A. K. Karabaev execute check-out tasks on a new third generation EVM.

USSR

USE OF AUTOMATED MANAGEMENT SYSTEMS IN UZBEK NATIONAL ECONOMY

Tashkent PRAVDA VOSTOKA in Russian ("Cybernetics Serves the National Economy") 11 Mar 78 p 2

[Text] The republic seminar convened by the resolution of the Central Committee of the Communist Party of Uzbekistan, which began its work on March 10 in Tashkent, was devoted to increasing the efficiency of ASU [automated management systems] and computer technology.

K. A. Akhmedov, deputy chairman of the Council of Ministers and chairman of the Gosplan of the Uzbek SSR, delivered a report.

The speeches of V. K. Kabulov, director of the Institute of Cybernetics and Computer Center of the Uzbek SSR Academy of Sciences and academician at the latter, V. A. Kazimov, chairman of the Tashkent Gorispolkom [Executive Committee of the State Council of Labor Delegates], T. Kh. Tashpulatov, first deputy minister of the building materials industry of the Uzbek SSR, and other seminar participants were devoted to various problems in the drafting, development, and improvement of automated systems being introduced into the national economy in accordance with the resolutions of the 25th CPSU Congress.

Approximately 100 automated management systems are helping to improve the work of different sectors in the national economy of Uzbekistan. They are operating at 97 computer centers equipped with high-speed electronic computers.

The experience accumulated has shown that, given the correct organization of their activity, automated systems exert a tangible effect. This particularly aided by the organization of specialized planning and design agencies to develop different-purpose ASU, and by broadening the training of cybernetics specialists in the republic's higher educational institutions and tekhnikums.

An important stage in the development of automated systems was the introduction of priority intersectorial ASU: planned accounting at the republic's Gosplan, and state statistics at the TsSU [Central Statistical Administration] of the Uzbek SSR. A republic automated management system (RASU) for the national economy is being developed.

The seminar examined the reserves for future improvement of automated systems, increasing their efficiency, and better using computer technology. This was reflected in the recommendations made at the seminar. The seminar program included an acquaintance with the best computer centers in Tashkent.

E. Extractive Industries, Fishing

USSR

INTRODUCING THE SAPR AUTOMATED PLANNING SYSTEM

Moscow MOSKOVSKAYA PRAVDA in Russian 25 Feb 78 p 3

ANDREYEVA, T.

[Abstract] An Automated Planning System [SAPR] is described. A Senior Scientific Worker of the Laboratory of the Theory and Methods of Automation of Planning, Candidate in Physico-Mathematical Sciences, Yuriy Arsen'yevich Flerov, is interviewed on the subject of automation of design. The laboratory is under the direction of Dr of Physico-Mathematical Sciences, Professor P. S. Krasnoshchekov. Flerov reports that the primary advantage of the new interactive system will be an improvement in the quality of planning, with additional advantages including increased speed of planning and a basic change in the psychology of the planning process. For example, a large deposit of oil has been discovered in Tyumen' Oblast. The electronic designer has helped engineers lay out roads and oil pipelines most economically and interconnect them. This work is performed at the Computer Center of the Academy of Sciences, USSR, in the section where Senior Scientific Worker, Candidate in Physico-Mathematical Sciences, V. R. Khachaturov works. The SAPR system has assisted in this process, liberating the designer from routine work while allowing him to continue to be in charge of the creative process.

USSR

AN AWARD-WINNING AUTOMATIC MANAGEMENT SYSTEM

Kiev RABOCHAYA GAZETA in Russian ("A Gold Medal for an ASU") 18 Mar 78 p 2

[Text] Pleasant news has come to the ASU [automatic management system] Donbassenergostroyindustriya [Donetskiy Coalfield Energy Building Industry] Trust. At the last stage of the competition for ASU, held at the VDNKh SSR [Exhibition of Achievements of the National Economy of the USSR], the work of the Donetsk programmers received a high mark and was awarded the exposition gold medal.

The ASU system was first put into operation in the trust in 1974 and even then attracted the attention of specialists. Now, besides planning, calculating resources, production control, planning technical-economic indicators, and other "planned" questions of production, the Donbassenergostroyindustriya ASU system is capable of even solving problems which would be beyond human capabilities without an electronic computer.

And there is another characteristic special feature of this system: by pressing a button one can obtain necessary data on many production problems on the screen of a SID-1000 terminal device working in a link with the computer.

A portion of the tasks for their ASU were developed by the trust's programmers in cooperation with the Institute of Industrial Economy of the Donetsk Branch of the UkSSR Academy of Sciences.

USSR

"KVARTs-2M" SYSTEM TO CONTROL WORK AT MEDVEZH'YE DRILLING SITE

Moscow PRAVDA in Russian ("The Controller--Automation") 14 May 78 p 1

[Text] Kaliningrad--13 May--A week ahead of schedule the collective of the Kaliningrad Association "Soyuzgazavtomatika" delivered the new system "Kvarts-2M" to the gas workers of Tyumen'. It will control work at the compressor shop at the Medvezh'ye site.

The "Soyuzgazavtomatika" Association [?All-Union Gas Automatic Machines] produces various systems and devices for automation and remote control for the use of gas producers. Its main consumer is the production workers of Western Siberia. Now the enterprise has begun to produce automated devices which will control the work of the gas pumping devices at Urengoyskiy Field. The association's collective has promised to fill this order ahead of schedule.

USSR

AUTOMATIC MANAGEMENT SYSTEM IN A CONCENTRATOR PLANT SECTION

Moscow IZVESTIYA in Russian ("Electronic Computer--Reliable Assistant") 9 Jun 78 p 1

MATSKEVICH, E.

[Text] At the Achisayskiy Polymetals Combine imeni 60th Anniversary of the October Revolution an automatic production management system [ASUP] is being successfully introduced.

A universal criterion of effectiveness of the technological process of flotation has been worked out for a concentration plant for the first time in this country.

Ore with different compositions arrives at the plant. It requires many stages of processing. Earlier, the process was controlled manually and the laboratory assistants had to make hundreds of tests per shift. Automation has now taken on almost completely control in one section of the plant. A small amount of slurry (ground-up ore mixed with water and impurities) arrives at the laboratory, where check samples are prepared from it. Samples are sent from there by pneumatic rabbit to the ASU shop to a KRF-18 spectral quantometer, where their compositions are determined under the effect of x-rays. A complete analysis is made in minutes. The data go from the quantometer to an electronic computer which precisely calculates the content of elements in the sample and transmits orders to the flotation section by teleprinter. Thus the possibility appeared of constantly monitoring the entire process, carrying it out under optimum and economic conditions and reliably controlling it.

The specialists have calculated that the introduction of the automatic control system has increased ore extraction up to 4 percent and saved millions of rubles.

The question of the wide introduction of an automatic management system for the entire plant is now being decided.

USSR

CREATION OF AUTOMATED SYSTEM FOR SUMMING UP SOCIALIST COMPETITION RESULTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("An Expeditious Machine Assistant") 13 Apr 78 p 4

LOZOVOY, A., L'vov

[Text] Work to create an automated system for summing up the results of socialist competition as an integral part of the "L'vov" ASUP [automated enterprise management system] is now underway at the "Elektron" production association.

Development of the subsystem "Summing Up the Results of Inter-Shop Socialist Competition" which makes it possible to obtain and display daily results of labor competition of the collectives has already been completed. The optimum composition of indicators basically describing the production operations of the shops during the past day and since the beginning of the month has been selected. This is, in the first place, the percentage of fulfillment of the plan for commodity production and products list, the level of growth of labor productivity, as well as the coefficients of quality of labor, use of equipment, regularity and losses from rejects.

Modern technical devices are used for acquisition and transmission of information and initial data and for processing and storing it. It insures processing efficiency and the validity of the indicators. This is, for example, the unit for control of the output of the product on the "Ritm" conveyor, the system for centralized control of the operation of "Signal" equipment and others.

However, it is important not only to promptly bring out the results, but also to inform the managerial and party executives of the enterprises and each competitor of them. This is the function of the special programmed device of the subsystem for summing up the results of inter-shop socialist competition and the subsystem for display of information of the "L'vov" ASUP. Results are displayed on an alphanumeric printer and the screens of the industrial television system.

In the color television set assembly shops, such displays have been placed at the entrance to the shop in a prominent place. They report how many television sets each section has made, the quality coefficient and the percentage of delivery of production since the first one, etc. Results of inter-shop socialist competition are shown on a larger display of this type installed on the territory of the pilot plant.

Practice has already shown that use of the computer ensures a more expeditious and qualitative summing up of the results of the competition.

USSR

THE COMPUTER AS A FABRIC ARTIST

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 8 May 78 p 4

PETROV, A.

[Abstract] Automated systems for fabric patterning and dye formulation have been in operation since November 1977 at the "Oktyabr'" Wool Fabric Production Association in Moscow. These systems were developed by the association in cooperation with the Central Scientific-Research Institute of the Wool Industry. The creative art work is still handled by human specialists, but the computer has taken over the purely technical aspects that involve detailed knowledge of the limitations of looms, characteristics of different yarns, possibilities of dye combinations and so on. The patterning system is called "Avtodessinator," and the dye formulating system--"Avtokolorist." Introduction of these automated systems has saved more than 400,000 rubles per year. The systems are to be introduced this year in three more textile enterprises: the Ivanovo Worsted Combine, the Kupava Fine Cloth Mill and the Podmoskov'ye Wool Fabric Association. Work is now in progress on adapting the systems for application to design on cotton, silk and linen.

USSR

NEW AUTOMATED MANAGEMENT SYSTEM AT THE NITROGEN FERTILIZER PLANT

Moscow IZVESTIYA in Russian ("The Computer--Technologist") 3 Jun 78 p 2

[Text] Estonia, Kokhtla-Yarve--An automated management system [ASU] for the process of carbamide production has gone into operation at the Nitrogen Fertilizer Plant of the Shale Chemical Combine imeni V. I. Lenin. Thereby, an agreement between scientists at the Institute of Cybernetics at the Estonian Academy of Sciences and production workers was fulfilled.

The introduction of the new automated system almost completely precludes the presence of people in harmful chemical environments. Every former ASU required the participation of an operator who had to receive the information and feed it into the computer; then the data received would be transferred to use in the production process. Now the machine completely supervises the complex production process, where in the course of 1 minute a thousand chemical reactions occur. This allows the exact regulation of the composition of the fertilizers obtained, which significantly improves their quality.

USSR

UDC 621.31.002.2:65.011.56:681.3

IMPROVEMENT OF OPERATIONAL MANAGEMENT OF POWERPLANT CONSTRUCTION USING THE ASIOR SYSTEM

Moscow ENERGETICHESKOYE STROITEL'STVO in Russian No 2, 1978 pp 83-85

DENISOV, G. A., engineer, and ROZIN, V. M., candidate in technical sciences

[Abstract] The All-Union Institute for the Planning of Electric Power Projects [Orgenergostroy], Power Engineering Ministry, USSR has developed an automated system of information means for management [ASIOR]. ASIOR is a universal, multi-purpose system which performs tasks in the area of planning, testing, accounting, analysis and prediction of the course of construction and installation operations, production of plan and estimate documentation, management of the delivery of materials, structures and equipment, as well as determination of the requirements for resources during the planned period; generation of multipurpose organizational programs with simultaneous processing of various construction models; the formation of standardized output documents; accumulation of statistical data on actual labor costs, construction times and reasons for deviations from planned costs and time; minimization of manual labor; creation of standard plan versions; and multistage continuous introduction of the system itself, from the simplest elements to the most complex, minimizing initial outlays of time for debugging and startup. The data base of ASIOR is described, as are the accounting and analytic task set, planning task set, output documents of the system and the plan for gradual introduction of ASIOR by stages with continuous improvement of the organizational structure and procedures as it is introduced.

USSR

NEW THIRD-GENERATION COMPUTER COMPLEX AT SCIENTIFIC-RESEARCH INSTITUTE

Leningrad LENINGRADSKAYA PRAVDA in Russian ("Helpers of Hydraulic Engineers") 12 Mar 78 p 2

BERESLAVSKIY, V.

[Abstract] A tandem complex of two third-generation computers has gone into operation at the All-Union Scientific Research Institute of Hydraulic Engineering imeni B. Ye. Vedeneyeva.

Candidate in technical sciences, L. B. Sapozhnikov, head of the institute's mathematics department, remarked that its specialists would be significantly aided in resolving scientific problems, planning energy-related objectives,

and making scientifically based recommendations to the builders and operators of the hydraulic, water storage, thermal power and nuclear power plants. The productivity of the new computer complex is said to be ten times higher than that of second-generation machines.

The electronic machines have already had a significant impact on planning the hydraulic dam of the Sayano-Shushenskaya hydroelectric plant and the foundation for the giant turbo-unit at the Kostromskaya State Regional Electric Power Plant, and the hydraulic structures which protect Leningrad from possible inundation.

The computer complex is capable of simultaneously solving several difficult problems and processing data on a time-sharing basis.

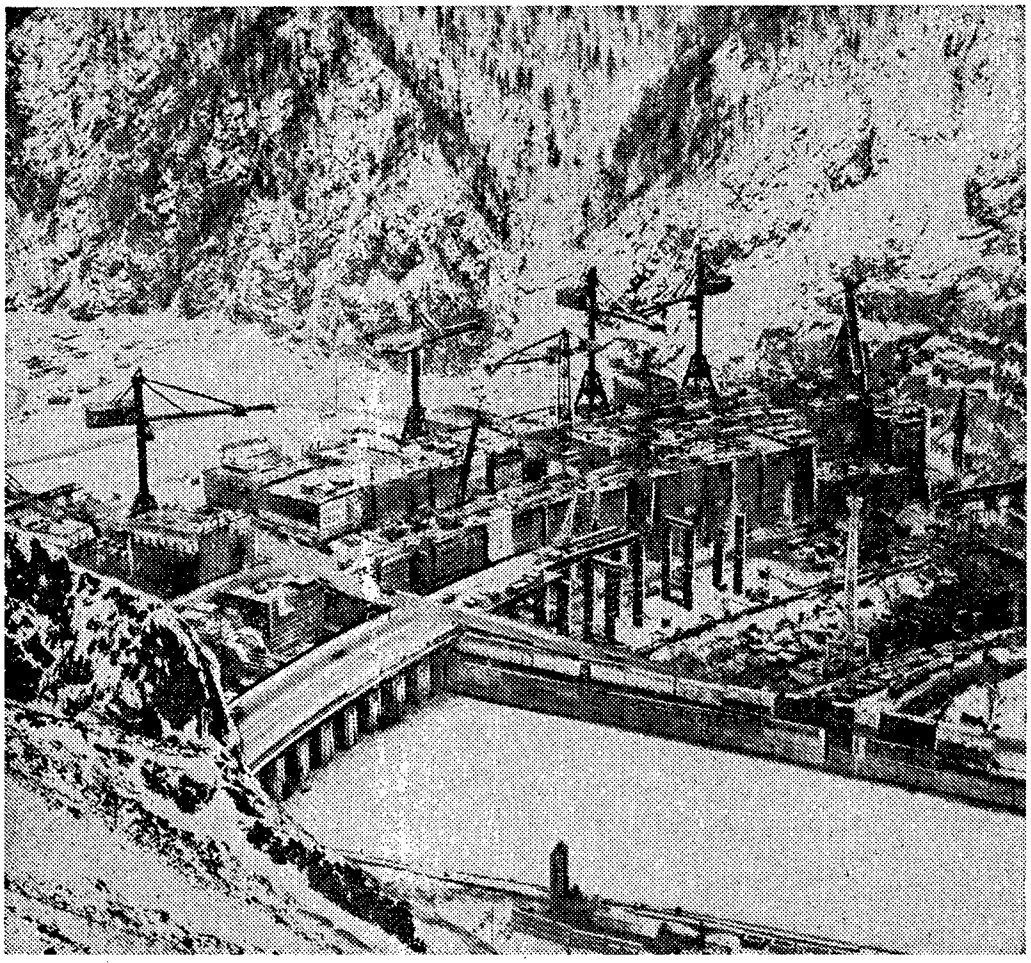
Electronic computers are expected to save hydraulic enterprises one and a half million rubles per year.

USSR

PROGRESS IN CONSTRUCTION OF SAYANO-SHUSHENSKAYA HYDROELECTRIC POWER PLANT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Mar 78 p 1

[Abstract] The photograph depicts the Sayano-Shushenskaya Hydroelectric Power Plant, designated for completion under the Tenth Five-Year Plan. The first unit of a turbine is already being assembled. The first generator is expected to be operational by 28 December 1978. Foundations for future substations on the granite slopes of Sayan are under construction as well.



H. Transportation System

USSR

COMPUTER CENTER FOR STEAMSHIP COMPANY

Moscow IZVESTIYA in Russian ("Electronics Helps") 21 Apr 78 p 2

KUDRYAVSKIY, L.

[Text] Omsk. The Information-Computer Center of the Irtysh River Steamship Company has gone into operation. The computer has taken on the solution of many problems related to the operation of the transportation fleet on main waterways whose overall length is more than 20,000 kilometers. During the current year the Irtysh river transport workers will handle freight traffic for more than 80 percent of the territories of Western Siberia.

USSR

INFORMATION-COMPUTER CENTER FOR RIVER TRANSPORT

Moscow IZVESTIYA in Russian ("The Computer Helps the River") 1 May 78 p 1

[Abstract] The Information-Computer Center of the Irtysh Steamship Line in the city of Omsk has gone into operation and will now be serving the largest water transportation route in Western Siberia. The center's computers are calculating optimal variants for the operation of the ports and optimal shipment routes and are increasing the carrying capacity of the fleet.

USSR

NEW AUTOMATED TRANSPORT CONTROL SYSTEM DESCRIBED

Moscow ZNANIYE--SILA in Russian ("Cybernetic Transport Controller") No 5, 1978 p 33

KHRISTOVA, NATASHA

[Text] The "ASTra-71-25" [automated system of transport] machine skillfully and rapidly manages 144 trucks and 12 heavy-duty excavators. A driver looks at a lit display which shows the number of the excavator to which he must drive up to for loading. After dumping the load, he again drives up to the display to find out his next course. The trucks are supplied with special transmitters which constantly send out coded signals to the "ASTra," thanks

to which it always knows where the vehicles are, counts the trips since the start of the shift and takes into consideration where work is not going well. If a driver should try to be cunning and drive up to the first excavator he comes across, the smart machine immediately locates the "mistake" and reacts accordingly.

In 1971, the Institute of Engineering Cybernetics of the Bulgarian Academy of Sciences was given the task of designing a system for expeditious management of motor vehicle transport. A collective headed by Professor Nikolay Naplatanov started working on the problem. That is how the "ASTra" system got started.

The specialized digital machine, designed by engineer Yevgeniy Radoykov especially to solve transport problems, has five basic units: internal memory (memory in which a system of programs has been recorded), immediate-access memory (stores incoming, intermediate and resulting data and constants), an arithmetic and logic unit--the "mathematician of the machine" which performs nine arithmetic and logic operations, the central control unit and the system for expeditious monitoring of the circuitry--an innovation designed to increase reliability in the operation of the entire machine. The designer of this specialized electronic machine received three patents for his inventions.

With the introduction of microprocessors and improvement of the machine through integrated circuits, the "ASTra" will also find practical application in managing city transportation in many cities. And the need for such a manager in the modern city is more than evident.

USSR

COMPUTERS AID CONSTRUCTION INDUSTRY PROJECTS

Moscow IZVESTIYA in Russian ["The Computer--Co-author of a Project"] 8 Jun 78 p 3

ZIBOROV, M., correspondent at the press center of the Ministry of Assembly and Special Construction of the USSR

[Text] When it is necessary to hoist a superheavy column or reactor at some construction project, they turn above all to the "Giprotekhmontazh" Institute.

Here, projects are worked out concerning the installation and assembly of heavy and large-sized apparatuses: various synthesis reactors, strong steel supports for overhead cableways, and equipment for oil refining plants.

At the same time, no two hoistings are the same; standard projects are precluded. And each new project represents dozens, hundreds of variants. How quickly and correctly can one choose the best--the variant in which the metal content of the equipment would be minimum and the labor productivity and reliability guarantee maximum?

"Everything changed after we decided to draw upon the help of computers," V. Popov, director of the institute, relates. "It turned out that for one hoisting of a column or cableway support alone there exist about 1,500 actual variants. And in all, taking into consideration the probable parameter variation boundaries for the equipment being hoisted at most of our construction projects (weight, dimensions, hoisting conditions), it would be necessary to examine nearly 2,000 variants! Only electronics can manage that."

Engineers have input into the machine's program all the existing GOSTs [All-Union State Standards] for the steel angle section, pipes, and assembly cable, and the response is being output in what is called ready form.

The effect of the work done at Giprotekhmontazh can be expressed in two words: simplicity and economy. Because of the correct selection and allocation of rigging equipment, the cost of assembling a ton of metal structures will decrease by 8-10 percent, while the labor productivity of the assemblers will rise by approximately 10 percent. And in addition, 10-15 percent of the metal and assembly cable will be conserved.

USSR

EXPERIENCE IN INTRODUCING A MODEL PROJECT OF INTEGRATED MECHANIZATION OF BOOKKEEPING USING THE M-500 D PUNCHED-INPUT CALCULATING SYSTEM

Moscow VESTNIK STATISTIKI in Russian No 3, 1978 pp 58-63

STORASTAS, P. and PUCHINSKAS, K.

[Abstract] Experience gained in introducing machine bookkeeping and accounting at the "Liberishkis" Sovkhoz in the Panevezhskiy Rayon of the Lithuanian SSR during the second half of 1976 is described. The work was done jointly by specialists of the Sovkhoz, the Panevezhskiy Information-Calculating Center and the Lithuanian branch of the All-Union State Planning-Technological Institute for Mechanization of Accounting and Calculating Work (VGPTI) of the USSR Central Statistical Administration.

A substantial portion of the preparatory work consisted of developing machine accounting codes for classification of various categories of workers, expenses, machines, tools, processes, agricultural products, construction materials, repairs, and services. These codes were developed on the basis of code structure guidelines approved by the USSR Ministry of Agriculture and the USSR Central Statistical Administration, with modifications to make the codes "applicable to specific farming conditions." Many of the codes are listed.

Stresses need for timely input and processing of information, for accuracy and timely updating of base information, for accuracy in preparing machine input and error checking, and for procedures to ensure timely processing and minimizing of errors during data preparation and processing.

The authors recommend (1) improving efficiency by return to originally envisioned approach of giving priority to the balancing of debits and credits, and spreading analytical work over the remainder of the month, and (2) automation of wage calculation, assignment of cost information, and logical checking of input and output information.

Many hours of machine time are now lost because of input and transcription errors that frequently require repetition of machine runs. Error checking is done by computing checksums of input and output information on hand calculators.

USSR

AUTOMATING ACCOUNTING ON LATVIAN FARMS

Moscow EKONOMICHESKAYA GAZETA in Russian ["An Important Part of Management"] No 16, Apr 78 p 18

ARKHIPOV, F., director of the Information-Calculating Center [IVTs] of the Ministry of Agriculture of the Latvian SSR, and OLESOVA, M., manager of the IVTs staff.

[Abstract] Between 1970 and 1977 the Latvian Ministry of Agriculture introduced a standard machine bookkeeping system in nearly half (i.e., 253) of the republic's kolkhoz and sovkhoz farms. This has resulted in savings of more than 1.5 million rubles and 350 bookkeeping positions with an annual budget of 352,000 rubles. At the same time the introduction of the system has resulted in more accurate accounting and more effective utilization of kolkhoz and sovkhoz resources because bookkeepers have been freed to check on the validity of data and inventories.

A planning-technological team of the Ministry's Information-Calculating Center is now assisting farms in switching to the new system, which is scheduled to be installed in all Latvian farms before the end of the current Five-Year Plan.

A follow-on system that will use computers to replace the accounting machines is in preparation. It will consist of 13 application programs covering all accounting tasks and will eliminate voluminous, time-consuming interim calculations now done with hand calculators.

The first application program ("Accounting for Truck Transport") has been completed and tested, and two others ("Accounting for Machine-Tractor Fleets and Work Performed by Horses and Manual Labor" and "Joint Labor and Wage Accounting") are ready for experimental use. All 13 programs are scheduled for completion by the end of the current Five-Year Plan.

Planning and testing of the computer accounting system is done by the Information-Calculating Center of the Latvian Ministry of Agriculture in conjunction with the Belorussian branch of the All-Union State Planning-Technological Institute for Mechanization of Accounting and Calculating Work of the USSR Central Statistical Administration, and the Latvian division of the Scientific-Research Institute for Planning of Computer Centers and Systems of Economic Information of the USSR Central Statistical Administration, and the Latvian State University.

Freed-up bookkeeping personnel will be able to focus on control and analytical activities.

Preliminary calculations indicate that the introduction of the three initial programs alone will save 1,100 man-days on each farm over machine-accounting.

But the most important gains will be strengthening of the most important departments with highly-qualified cadres, a sharp increase in the efficiency and quality of bookkeeping, and the resulting improvement of production efficiency.

Only the application of modern computer technology to the accounting process will make possible the fundamental improvement in accounting on kolkhoz and sovkhoz farms needed to bring accounting to the level of efficiency and quality required by today's agricultural production.

Note: This article is virtually identical to another entitled "Computional Technology in the Village" by the same authors published in SOVETSKAYA LATVIA, 31 Mar 78.

USSR

COLLECTIVE-USE COMPUTER CENTER

Tallin SOVETSKAYA ESTONIYA in Russian 14 Apr 78 p 3

[Text] Construction of a computer center in Tallin for the Central Statistical Administration (TsSU) Estonian SSR has been completed. This computer center is being used as the basis for the establishment of a collective-use computer center. It is equipped with a complex of third-generation computers and the latest resources for teleprocessing of information. There are still only a few such centers in the country.

In the photograph: engineer Galina Gretskaya standing by the computer.

USSR UDC 621.325:336.1/5

DATA PROCESSING FOR GOSSTRAKH UNDER AUTOMATED MANAGEMENT SYSTEM CONDITIONS

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYE PROIZDSTVO in Russian No 2, 1978 pp 48-49

DUBROVINA, G. I., engineer

[Abstract] At present in organs of Gosstrakh [Main Administration of State Insurance, Ministry of Finance, USSR] a new means of calculating procedures is being introduced for processing of insurance information for computation of contracts and for computation and checking for entries of insurance contributions, payments, and the like. With this end in view, insurance organs are being equipped with electronic keyboard computers [EKVM]. It is provided that by 1980 up to 20 thousand keyboard computers will be turned over to the bottom components only of insurance organs. In the inspectorates of Gosstrakh many problems are solved by PVM [punched-card computers] and electronic computers (Type "Minsk-22, "Minsk-32"). However, machine time is rented in external devices of the TsSU [Central Statistical Administration] system because in the organs of state insurance their technical bases are lacking. At the beginning of 1977 insurance documents were processed on PVM and electronic computers at 1068 inspectorates. At present, one mechanized and four automated systems for conducting insurance operations function in the Gosstrakh. Their principal goal is the machine processing of information for computation of the work of agents, sections and inspectorates as a whole in all forms of public service insurance. In comparison with traditional forms of processing insurance information on KVM [keyboard computers] the above systems assure a greater reliability of the results of machine processing of documents on the basis of accomplishment of work of a checking nature. A system of complex mechanization of bookkeeping and insurance operations in inspectorates of Gosstrakh on PVM was introduced in Moscow, and a system of management of computation of insurance operations in the inspectorates of Minsk, Kiev, Gomel' and Moscow. Just now introduction of electronic computers of the "Ryad" system is taking place. The "Ryad" has peripheral equipment in its assembly which makes it possible automatically to record varied factual data, as well as feed varied information into the electronic computer. Also at present, work is being conducted on the creation of an automatic management system [ASU] at the lowest level of Gosstrakh--in the inspectorates. The All-Union automated system "ASU-inspectorate," based on the YeS 1030 electronic computer is called upon to assure reliability of management of the operations of state insurance, to reduce the labor intensity and net cost of conducting individual operations, and to increase the quality of service for the population. With the aid of "ASU-inspectorate," in the establishments of Gosstrakh, a solution is provided for all the principal problems in accordance with the functional and organizational structure of the inspectorates of Gosstrakh. The problems are combined into four subsystems: 1) Planning; 2) "Operational management of insurance"

[OPUS]; 3) Bookkeeping; and 4) Statistics. All the problems are interdependent among themselves and the majority are solved simultaneously. At present, in many Ministries of Finance of the union republics, computer centers [VTs] (clusters) are being created at which processing of insurance information is provided. Later on, it will be possible at these VTs to perform work with respect to the creation of consolidated data already as whole in the republic in question.

L. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

AUTOMATED MANAGEMENT SYSTEM FOR DNEPR BASIN

Moscow IZVESTIYA in Russian ("Electronics Controls the Dnepr") 24 May 78 p 1

SAMOYLENKO, N.

[Text] The engineering design of an automated management system for the water management complex of the Dnepr basin (the ASUB Dnepr) has been developed by Kiev specialists.

"The rapid development of the national economy in regions drawing on the Denpr," relates the chief of the Main Administration for the Comprehensive Utilization of Water Resources of the Ministry of Land Improvement and Water Management of the Ukrainian SSR, O. Rusinov, "has led to a sharp growth in the water consumption from this river basin. The realization of the project plan for the ASUB Dnepr, worked out by the 'Ukrgiprovodkhoz' [Ukrainian State Institute for Water Management Planning] specialists in conjunction with a number of the other institutes of the nation, will assist in avoiding a water shortfall."

And just how does the system, which will be able to control an entire river by means of electronics, look to the designers?

"Its first stage," says chief project engineer, Yu. Yamburenko, "provides for the planning for the comprehensive utilization of water resources. The zone which is encompassed by the system includes the cascade of water reservoirs, large canals and irrigation systems."

The electronic brain with the powerful computer center is located in Kiev. Its equipment complement includes the newest computers, to which information will come in via communications channels from the entire territory of the basin. With the expansion of the water resource utilization planning system, even the quality of the water in the river will be taken into account.

USSR

ASU FOR FIRE PREVENTION DEVELOPED

Moscow IZVESTIYA in Russian ("ASU Against Fires") 17 Jun 78 p 3

MOSIN, I.

[Text] The first stage of an automated management system (ASU) for forest conservation has been developed at Leningrad Scientific-Research Institute for Forestry.

Currently 17 territorial air bases are protecting the forests from Petrozavodsk to Magadan, from Murmansk to the southern boundaries of the country. Nearly 10,000 air-supported firefighters, supported by hundreds of helicopters and airplanes, keep vigilant guard duty. In spite of this powerful army, fire-fighting yet requires many efforts and resources.

Leningrad scientists have developed a design for an unusual ASU which significantly reduces the firefighters' labor. From 50 to 95 percent of fires in this country can be traced to two or three oblasts, and within the oblasts to two or three rayons. The oblasts and rayons have varied from year to year. As a rule, the weather is a factor in many of the fires.

The ASU will retain in its memory all weather-related data over a period of several years in a given rayon, including all fires which have occurred, and the value of the forest involved. Every day fresh information will be brought in concerning wind velocity, humidity, and air temperature. Under these conditions the complex will "play through" all possible situations in which a fire could occur and will inform observers as to the optimal schedule of work for a given day.

USSR

NEW AUTOMATIC MEANS FOR SCREENING ENVIRONMENT DETAILED

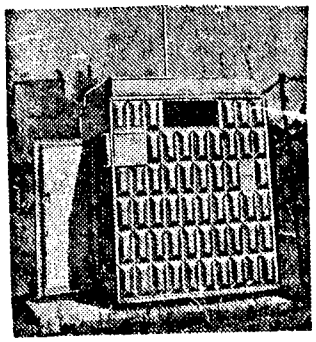
Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Automatons Guarding Nature") 2 Mar 78 p 4

LUPENKO, A.

[Text] This year in Moscow construction will begin on the Center for Collecting and Processing Information on the State of the Urban Environment. The center's electronic facilities will be directly connected to stationary and mobile laboratories. An electronic computer will gather all data concerning the condition of the air, process them, and deliver them to users in a convenient form. With the aid of these data it will be possible to compile a unique map of the purity of the urban atmosphere which will help in planning and distributing more precisely the growing transportation flows, designing rest zones, and distributing new industrial enterprises.

Along the lively main streets of the capital the attentive gaze can notice rather small, silver stands with a little door and a weather vane on top. For what are they needed? These stands are called "posts." Within each of them is a laboratory. Several devices automatically determine the sulphur dioxide and carbon monoxide content in the atmosphere and delicately catch the slightest change in the air's chemical composition. Three times a day a specialist makes the rounds of the "posts" and removes the tapes containing the devices' readings from the recorders. The information goes to the Central High-Altitude Hydrometeorological Observatory, where it is processed and analyzed, and, if the level of atmospheric contamination is higher than the norm, where emergency administrative measures are taken.

The "posts" are the cells of a future automated system for observing and checking the condition of the environment and the atmosphere's purity: ANKOS-A (atmosphere). Besides the stationary laboratories, the first mobile, "Atmosphere"-type laboratories have been created for the analysis of atmospheric contamination in industrial entity zones and at large highways.



(In photo: "Post-1")

These laboratories may be used by urban and district sanitation and epidemic stations.

Checking of water purity is very much similar to the work on observing the atmosphere. Means have been created for checking the condition of "surface waters." Devices have been developed and are being series produced that determine the content of metals in the water, the silt density, and the concentration of poisonous admixtures. But the main thing is that a set of apparatus has been created and set into operation that is consolidated with the ANKOS-V (water) automated system. The experimental phase of this system, which includes several stations, automatically transmits checking data to the information processing center.

"Based on the ANKOS-A and ANKOS-V automated systems, our ministry, in cooperation with the Glavgidrometsluzhba Main Hydrometeorological Service and other organizations, has developed a large program for the future," relates V. Orlov, deputy chief of the Scientific and Technical Administration, Minpribor Ministry of Instrument Making, Automation Equipment and Control Systems, USSR . "Based on the results of the operation of these first experimental systems, model ones will be created. In them, and with the help of electronic computers, the condition of water and air basins will automatically be analyzed, and the data will go to the city's computer center. In the future, systems serving on the scale of union republics and the whole country will be created."

USSR

COMPUTERIZED AIR POLLUTION MONITORING SYSTEM DEVELOPED FOR MOSCOW

Moscow MOSKOVSKAYA PRAVDA in Russian ("Air Patrol") 27 May 78 p 2

PORUDOMINSKAYA, M.

[Abstract] A computerized system for observation and monitoring of the atmosphere, called "ANKOS-A", is being developed in Moscow at the USSR State Committee for Hydrometeorology and Environmental Monitoring in cooperation with several other agencies and ministries. Monitoring stations with automatic air pollution sensors will be set up throughout Moscow, and the data obtained will be relayed by special communications channels to an Information Gathering and Processing Center equipped with a computer complex, chemical laboratory, control station and mobile laboratories. The first permanent stations are to become operational this year; the third stage several years later.

III. SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS

A. Education

USSR

ACTIVITIES AT THE COMPUTER CENTER OF THE SIBERIAN DIVISION, ACADEMY OF SCIENCES, USSR

Moscow GUDOK in Russian ("Speak To Me, Computer...") 13 Jan 78 p 4

ZELENTSOV, A.

[Abstract] This article describes the computerized design of new transportation equipment which is underway at the Computer Center of the Siberian Department of the Academy of Sciences, USSR. The primary direction of operation at the Computer Center is to develop interactive computer systems capable of answering questions directly in human language, bypassing the need for highly trained computer programmers to deal with the computers through time-sharing terminals. The equipment room of the Computer Center contains three BESM-6 computers, which are on-line 20 hours per day, solving hundreds of problems of the most varied nature. A brief description is presented of a walking robot, capable of solving the problem of deciding where to take its next step on uneven terrain.

USSR

FORMAL EDUCATION IN THE FACTORY

Moscow PRAVDA in Russian ("Faculty at Plant") 15 Feb 78 p 2

YEVLADOV, B., correspondent

[Abstract] At the "signal" Plant, in the design or engineering department, the computer center or directly on the production line, engineers who have studied "Design and Production of Electronic Apparatus" at the Kishinev Polytechnical Institute imeni S. Lazo, while working at the plant continue their accustomed work, which they performed the entire time they attended the institute. The plant director, I. Bordyugov reports that these young engineers do not simply arrive at the plant with a "suitcase of knowledge" they have picked up at some university, but rather take over new duties as qualified specialists in microelectronics, their on-the-job experience gained by working at the plant while attending the institute, which reduces the time it takes for them to become full-fledged qualified production engineers by at least one year. Testing of a complex electronic circuit by means of a tabletop punch-tape programmed computer is briefly described. Two other engineers at the plant have developed a specialized language called "test," which is used as a part of the plant's automated quality assurance program. Students who study at the plant in specialized classrooms set up there grow up with their new ideas, participating in their

realization in practice and immediately acclimatizing themselves with the production team. The constant cooperation between the plant, the school and scientific-research organizations has helped the workers of the plant to solve a number of difficult production problems, in addition to providing workers who are both well-trained theoretically and thoroughly experienced in practice.

USSR

TRAINING WORKERS IN CYBERNETICS

Moscow IZVESTIYA in Russian ("A School for Cyberneticists") 23 May 78 p 3

ALEKSANDROVA, Z.

[Text] The Ispolkom [executive committee] of the Altayskiy Kray Soviet of People's Deputies has decided to open the fifth educational-production combine in Altay.

In the evaluation of A. P. Yershov, a corresponding member of the USSR Academy of Sciences, the complex for young cyberneticists with its own computer center will raise work on the professional orientation of school children to a principally new level.

The idea of its creation arose long ago. But the beginning of its materialization into life can be taken to be the decision of the scientific council on problems of education of the Siberian Department of the USSR Academy of Sciences taken in November of last year. At that time the council reviewed the plan for organizing this complex proposed by G. Polyakova, a senior engineer in the Altay Polytechnic Institute, and E. Porer, a teacher, as well as the conclusions of the expert commission of the Siberian Department which approved the plan of the citizens of Barnaul.

And here is the first practical result of the collective efforts of the scientists and the Altay party and government organs--a scientific-production complex for young cyberneticists in Barnaul. It will consist of a school computer center, laboratories for scientific and production experimentation, and an optional school for the future specialist. Its goal is the scientific and technical professional orientation of the students and their pre-professional preparation for scientific and technical creativity. Meanwhile one can say that the students will learn to use computers and to comprehend various aspects of their application in the national economy, which, of course does not at all mean that the complex is intended only for future mathematicians and technicians who will service computers and various automated control systems. The knowledge and skills acquired here can be employed in

a multitude of professions and above all in new ones developing in the course of scientific and technical progress.

The participation in this work of the Siberian Department of the USSR Academy of Sciences signifies the creation of a pedagogical system which provides for the integration of science, education, and production.

The Siberian Department of the USSR Academy of Sciences is prepared to create in conjunction with the Barnaul complex for young cyberneticists an unplanned for station of pedagogical cybernetics which will be directed by scientists of the department and specialists from Altay and which will provide the necessary education free of charge.

B. Artificial Intelligence

USSR

DEEP SUBMERSIBLE ROBOTS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian ("Robots in the Depths of the Ocean") 7 Jan 78 p 3

YASTREBOV, V., deputy director, Institute of Oceanography, Academy of Sciences, USSR

[Abstract] The Institute of Oceanography has been studying the question of the possibility of the creation of machines with "creative" tendencies for use in oceanographic research. This article describes the design of a deep submersible robot in general terms, from the lowest level of actuating systems through the tactical level at which "what and how to do" is decided, up to the "strategic" level, where the task can be formulated as, for example, "study a given region, seeking areas where hot water flows from the sea bed and take samples of the water." The "Manta" oceanographic robot, developed at the institute, is a second generation robot, equipped with a screw drive, television system, sensing manipulator and minicomputer. The device can operate at depths of up to 1500 meters. The "Skat" robot is now under development, and when completed will be a still more advanced version, in which "intelligent" control is extended not only to the manipulator as in "Manta" but also to the propulsion system of the entire device.

USSR

THE ROBOT IS "THINKING"

Moscow SOVETSKAYA ROSSIYA in Russian 19 Mar 78 p 8

BILYALITDINOVA, G., correspondent

[Abstract] Professor Lev Timofeyevich Kuzin, doctor of technical sciences and recipient of a State Prize, heads the Chair of Cybernetics at the Moscow Physico-Technical Institute and there directs research on the development of an artificial brain. In an interview with this correspondent he explains man's need for assistance in solving complex problems of modern life. Accordingly, systems are being developed which can help man make decisions in such areas as economics, for example, and even take over the decision making process entirely. Such a system, called a robot, actually simulates a brain to the extent that it becomes difficult to distinguish between man's and machine's contribution to formulation of strategy. An essential component of such a system is its memory, where "experience" is

stored, and the characteristics of this memory will determine the capability of the thinking machine as well as the functions it can perform. It must also have the equivalent of senses for identifying the environment, not necessarily with electronic circuitry but rather through a well designed language to ensure maximum compatibility for man-to-machine communication. An important problem in the development of an artificial brain is to simulate the "fuzziness"of man's decisions and to reconcile this "circumventible" characteristic of man with the precision of computer calculations. As to the looks of such an artificial brain, it will not have a man-like appearance described by science-fiction writers but the much more unimaginative form of magnet tapes, disks, and drums. In order to communicate with this equipment, man will also need a computer and a display device such as a television screen. Original work on the project has been done at the Moscow Physico-Technical Institute, at the Computation Center of the USSR Academy of Sciences (Siberian Division), and at several research centers in the United States, Systems of this kind are already used for traffic control at the Odessa seaport and at the Vnukovo airport; one was also used in the Apollo-Soyuz space mission. Although a robot cannot itself make new discoveries, it can greatly help man make them. For instance, without it man could not possibly discover new chemical elements on the basis of a myriad of experimental data.

USSR

LITHUANIAN WORK ON INDUSTRIAL ROBOTS NEEDS REORGANIZATION

Vil'nyus SOVETSKAYA LATVIA in Russian ("Robots Come to the Department") 30 Mar 78 p 2

MALYSHCHIKOV, V., chairman of the Republic Civic Committee for Improving Auxiliary Operations in Industry of the Lithuanian Republic Council of NTO's [scientific and technical societies]

[Excerpts] "The State is concerned with improving working conditions and work safety and the scientific organization thereof and with reducing and, eventually, completely eliminating heavy physical labor, based on the integrated mechanization and automation of production processes in all branches of the economy."--(Article 21 of the Draft of the Lithuanian SSR Constitution)

A distinction between the robot and other machines and automatic mechanisms consists of the fact that it operates in accordance with the principles of human manual labor and it can also be "taught," and these impart to it a most valuable characteristic, versatility, which has no counterpart in other automatic mechanisms.

Industrial robots now have a rigid operating program of action, and they are lacking in feedback. Notwithstanding a number of limitations in potential application, their number is growing papidly and in coming years will reach several thousand. Even now robot models are being developed which will possess coordination of movement with perception which will be suitable for semiskilled labor in the manufacture of parts. At present there exist only laboratory prototypes of these, controlled by electronic computers. But in the future there will also appear robots with an artificial intellect which can open up a potential for full replacement of man in the area of skilled manual labor. The appearance of serially produced models of such robots is forecast for the 1980's.

In essence, the sphere of application for industrial robots is unlimited. But robots are only one of the elements of an automation system. Their areas of application are, as a result: the tending of metal-cutting machine tools, including those with ChPU [numerical programmed control] loading and unloading work, transport and warehousing operations, stamping operations, the tending of the heat-treatment process, painting and galvanizing operations, and so on.

Thus, for example, during stamping work, robots will automatically feed the workpiece into the active press zone. In so doing, the shiftwork factor and equipment utilization coefficient will be raised, labor productivity will be increased, and working conditions will improve. The introduction of one industrial robot for stamping work will yield an annual economic benefit of about 3,000 rubles. The use of robots to tend machines for pressure die-casting injection will enable the process of liquid-metal pouring, casting-mold lubrication and finished-casting removal to be automated. It will raise the precision of proportioning by three times and prevent slag ingress and metal splash, which will reduce losses of metal and the consumption thereof by 3-5 percent. The foundryman's work will be transformed into that of a setup-operator.

Thus, from the economics point of view, the main purpose of using industrial robots is to reduce the cost of production, while raising labor productivity. Growth thereof will be achieved by reducing manning by the workers who tend equipment in the sections where the robot is being introduced, and also by a rise in the productivity of this equipment. Labor productivity growth with the use of robots is made up of several components. First, as a rule, a higher speed for transporting blanks and workpieces will be provided for. Second, the robot does not tire, it works at a work pace which is constant and usually higher than a person's, and it is not sensitive to working conditions. Third, the percent of spoilage is reduced, and, finally and fourth, the use of robots creates favorable conditions for increasing the use of equipment in shiftwork, and the output of products from the same production space is increased.

In our republic, work on the creation and use of industrial robots in production is being conducted in the Vibration Technology Laboratory of the Kaunas Polytechnic Institute imeni Antanas Snechkus, the Ekranas plant at

Panavezhis, and the Vil'nyus Plant for Radio-Measuring Instruments imeni 60-Letiya Oktyabrya. At the latter enterprise, a design bureau which is engaged in creating robots for the automation of stamping and painting operations as well as the integrated automation of a section of machines for pressure die-casting injection was specially created for the first time in the republic.

Unfortunately, the work at enterprises is being done in isolated fashion, an exchange of information and experience in creating robots and systems thereof has not been arranged, and there is none of the coordination which is requisite to the conduct of this work on the republic-wide scale, which would later help in establishing cooperation in the creation and use of common robot systems.

The republic's scientific and technical society should, in our view, do much in this area by uniting scientific and technical societies, with the cooperation and assistance, of course, of party, soviet, economic and trade-union organs. In considering existing experience in mechanizing manual work in industry, we consider it desirable, on the basis of the creation, centralized manufacture and introduction of minor mechanization equipment.

To create a single information-coordinating center for industrial robots. It should include, along with scientific workers and representatives of the republic gosplan's Division of Science and Technology, representatives of the republic's Institute of Scientific and Technical Information and Technical and Economic Research, as well as representatives of republic enterprises and organizations which are working on the task of creating and using industrial robots. It will become an active element in linking science with production; and

To organize patron-type assistance in solving the problem of creating robots and introducing them into the republic's industry, in which the Lithuanian Republic's Council of Scientific and Technical Societies, the PKI [Kaunas Polytechnic Institute] imeni Antanas Snechkus, and VISI, as well as the Plant for Radio-Measuring Instruments imeni 60-Letiya Oktyabrya and the Ekranas plant, would participate. This will help to shorten the path between creation and introduction.

All the named measures will enable the production of industrial robots for the automation of stamping, painting, warehousing, and lifting-and-transporting operations, and other work with a predominance of physical labor, to be set up more rapidly.

IV. NATURAL SCIENCE RESEARCH

A. Biology and Medicine

USSR

COMPUTER CENTER TO AID LIFE SCIENCES

Moscow PRAVDA in Russian ("Brain versus Computer: Dialog without Interpreter") 29 Apr 78 p 3

IVANOV, K., professor and Acting Director of the Leningrad Institute of Physiology imeni I. P. Pavlov of the USSR Academy of Sciences

[Abstract] The first computer center devoted specifically to support of biological and physiological research has been established at the Institute of Physiology imeni I. P. Pavlov of the U.S.S.R. Academy of Sciences in Leningrad. It serves four other biologically oriented academic institutes in Leningrad and has already helped solve hundreds of problems during the past several years.

The new computer center has built up a staff of highly qualified mathematicians, engineers, and programmers, and it is now ready to extend its services to all other biologically-oriented academic institutes in Leningrad.

Establishment of a computer center devoted especially to the life sciences was made necessary by the fact that, while the advent of computers has led to increasingly quantitative research into physiological and biological processes, biologists, physiologists, and physicians had been unable effectively to use the services of other computer centers because they lacked the specialists needed to aid them in properly utilizing the machines.

This prevented them from building up on the substantial mathematical work done in the past 10 to 15 years on models of such fundamental physiological processes as blood circulation, breathing, secretion, thermo-regulation, vision, hearing, nerve cells, and a number of brain functions.

Research aided by the new facility includes the following:

Transmittal of physiological information within the nervous system.

Transmittal of visual perception, potentially leading to the development of devices for automatic image recognition.

Transformation of acoustical signals in the human hearing system with the potential of leading to automatic speech recognition.

Preservation and effective utilization of biological resources. This has included the development of a mathematical model of the numerous dependencies for the propogation and development of salmon in Lake Dal'niy by a team headed by V. V. Menshutkin of the Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov of the U.S.S.R. Academy of Sciences. This work was awarded a State Prize.

As concerns the brain-computer analogy, Soviet scientists have reached no definite conclusions but are inclined to believe that a direct analogy does not exist; that the brain is infinitely more complex than any computer; that its work is based on other principles; but that some similarity nevertheless exists, specifically in the area of complex decisions based on a vast quantity of information constantly taking place in the central nervous system.

USSR UDC 621.397:681.322

ALGORITHMS FOR OPTIMIZING DATA TRANSMISSION AND COMPUTER NETWORKS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 14-19 manuscript received 30 Jun 76; after completion, 27 Dec 76

ZAYCHENKO, YURIY PETROVICH, candidate in technical sciences, Kiev Polytechnical Institute (Kiev)

[Abstract] Optimum determination of the locations of shared-time computer centers and the structure of data transmission networks is considered. Variables include the volume of information to be processed at station x; the longitude and latitude of station x; the set of stations where shared-time computer centers can be set up; and the distance between stations x and y. The cost function for a connection between stations x and y is dependent on capital outlays per channel-kilometer; the normal factor for recouping capital investments; the rental costs of a single telephone channel; and the carrying capacity of the telephone channel. As to the data transmission network, approximate algorithms successively refine the array of subscribers connected to the network stations by iterations. Next, the structure of the subscriber data transmission network is to be constructed in the class of treelike structures so that minimum outlays in data transmission in the network are achieved. In interlinking the computer network with the data transmission network, use is made of an algorithm for optimizing the topology of the intercenter communicatcns network for handling the assigned message traffic at minimum cost. A program package was compiled from these algorithms for a BESM-6 computer. The package was used in the designing of computer networks for a number of rayons, especially in the Latvian SSR, Odesskaya Oblast and other areas. Network nodes correspond to city-subscribers of a shared-time computer network. The program for constructing the trunkline data transmission network served for the intercenter communications network in the Ukrainian SSR. The topology showed certain redundancy. Figures 2; references 9: 2 Russian, 7 Western.

USSR UDC 65.011.56:62-52./14

PROIZVODSTVO AUTOMATED INFORMATION-RETRIEVAL SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 112-119 manuscript received 26 Jul 76; after completion, 29 Nov 76

LIVINTSEV, LEVINIKOLAYEVICH, candidate in technical sciences, 1st Secretary, Zelenograd Rayon Committee, CPSU (Moscow); LUKASHOV, VALERIY YEVGEN'YEVICH, engineer (Moscow); and NAYDIN, YURIY IVANOVICH, division chief, Zelenograd Rayon Committee, CPSU (Moscow).

[Abstract] Information flows from enterprises and organizations are of two kinds: information about the use effectiveness of productive capacities and material, labor and other resources; and information about the fulfillment of the production plan in the main technical-economic indicators. The Proizvodstvo [production] automated information-retrieval system [AISS] was developed and introduced for handling these information flows in the Zelenogradskiy Rayon Committee, CPSU in Moscow. Data are daily transmitted from enterprises to the system's data bank over teleprinter channels showing actual plan fulfillment as to gross product output and sales, output of consumer goods, fulfillment of product line plan and strength of industrial production labor force. More than 40 kinds of reports in 14 formats feed into the data bank. Software for the system includes a computer network multiplexor accommodating up to 14 channels. The system's data bank uses magnetic tape storage. The software is written in M-220 computer autocode and has a total volume of more than 4 K machine instructions. Inquiry response time varies from 15 sec to several minutes. Figures 10; references: 5 Russian.

USSR UDC 681.32:614.446

AUTOMATIC DATA PROCESSING IN RECORDKEEPING AND ANALYSIS OF THE MORBIDITY OF THE UKRAINIAN SSR POPULATION IN INFLUENZA AND RESPIRATORY DISEASES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 121-124 manuscript received 4 Jan 77

VIRDARSKAYA, IRINA PETROVNA, group leader, RIUTs [?Rayon Information Computing Center] Ministry of Public Health, UkrSSR (Kiev); GULYAYEV, ALEKSANDR IVANOVICH, candidate in technical sciences, RIUTs, Ministry of Public Health UkrSSR (Kiev); and DEMENTKOVA, ANNA IVANOVNA, group leader, RIUTs, Ministry of Public Health UkrSSR (Kiev)

[Abstract] An automated system for operational recordkeeping and analysis of morbidity in influenza and respiratory diseases, the GROZA system, was developed in the Republic Information and Computation Center of the Ministry

of Public Health, Ukrainian SSR. Daily, a number of the main indicators of the morbidity in influenza and respiratory diseases are collected in the GROZA system: the number of recorded cases, the number of hospitalizations and the number of fatal outcomes. Two kinds of data collection are described: in the first variant, data are collected daily from seven control Ukrainian cities (they include large cities showing the earliest signs of an epidemic); in the second variant, data come from all 26 oblast centers in the Ukrainian SSR and cities of republican jurisdiction (data arrival dates are set according to the spread of an epidemic). Data from oblast and city sanitary and epidemiological stations are either computer-processed or hand-processed in case of computer breakdown. The usefulness of consolidated case reports in short-term forecasting of the course of an epidemic was judged by finding changes in the pattern of cities with the highest morbidity levels in each preceding 30-day period. For savings in machine time, the 10-module algorithm for processing information was rewritten in Minsk-32 computer autocode. At present the system is being converted to the unified computer system. About 11,000 rubles a year was saved in information processing costs. Figures 1; references 3: 2 Russian 1 Western.

USSR UDC 001.2:622.269./19

RESULTS OF DEVELOPING A SHARED-TIME INFORMATION RETRIEVAL SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 128-134 manuscript received 18 Jul 75; after completion, 25 Nov 76

VAL'KOV, VITALIY MIKHAYLOVICH, candidate in technical sciences (Leningrad); KOLESOV, VLADIMIR NIKOLAYEVICH, engineer (Leningrad); and ROZHDESTVENSKIY, MIKHAIL GERASIMOVICH, engineer (Leningrad)

[Abstract] Information retrieval systems for users at widely varying levels of organizational management must meet critical requirements: multidimensional character of the data bases for users making essential simple and convenient outputting of information in varying detail; short waiting time (in the range of seconds) for most common inquiries; release of answer on cathode-ray tube or hard-copy printer; shared use of information retrieval system in shared-time mode for greater system effectiveness; and units for automating data preparation, input, updating, search and outputting. The equipment complex includes an Elektronika I-210 information and computation complex with built-in software and user station equipment. The information retrieval system has four NML-67 magnetic tape storage units, two YeS-5052 magnetic disk storage units, a 16 K (24-bit words) permanent storage and a 4 K (24-bit word) immediate-access storage, an ATsPU-128-3M printer, input/output units based on T-63, YeS-9021 and FS-1501 units and

Videoton-340 display and user console. Categories of information stored include: subject-matter information; catalogs; auxiliary texts; reference manuals; control tables; protocol information; and nonstandard processing programs. The system can find use autonomously or as an information retrieval system transferring data from the Main Data Bank of the Automatic System for Operational Control, because equipment was developed for automatic interchange of the Elektronika K-200 with the Minsk-32 and the BESM-6. Figures 3; references 4: 3 Russian, 1 Western.

USSR UDC 528.7.778.35:522.61:771.534:531:429:621.391:681.515.8

OPTOELECTRONIC SYSTEMS AND AUTOMATING EXPERIMENTS

Novosibirsk AVTOMETRIYA in Russian No 5, Sep/Oct 77 pp 7-12 manuscript received 26 Jul 76

NESTERIKHIN, YU. YE. Novosibirsk

[Abstract] Model automated data acquisition and processing systems for experiments in engineering physics and biology are under design at the Institute of Automation and Electrometry, Siberian Department, Academy of Sciences USSR. A problem-oriented, institute-wide complex of functional subsystems is being adapted for greater symmetry relative to remote processing systems; each subsystem must be computer-independent and link up both computer and specialized units. The communication subsystem is a mainline information interchange system: a multicrate mainline modular system patterned after CAMAC principles. Interaction in the subsystem takes place between "subscribers"--the computer, specialized peripherals, systems for information acquisition and processing and so on. Information is interchanged among subscribers control by communication processor-controllers, via a 24-bit mainline channel at a clock frequency of 1 MHz. The mainline information interchange system operates in the "inquiry-answer" mode, thereby enabling parallel information interchange between several pairs of subscribers. Complex expansion is very simple: adding on a single subscriber interface is sufficient. (Trial operation of the complex began in 1973 and confirmed the soundness of the system principles.) A delta graphics display was developed for data processing and simulation in the interactive mode. A planshet graph plotter-encoder was built for high-speed curve plotting. A Karat computer output microfilm unit handles graphic and alphanumeric information displayed on its cathode ray tube. Photographic images of microbiological preparations are processed on a Zenit unit. Most peripherals are based on E-100I minicomputers. Imagery dissected and compared with formalized a priori data includes photographs of the celestial sky and bubble chamber tracks. Adaptive input of imagery into the computer is based on rapid measurement, on computer instructions, of the optical density (or transmission coefficient) of a photograph,

500x500 mm^2 format. Laser interferometers with a reading resolution of 0.32 microns are used in exact coordinate measurement. On computer instructions, the light spot of a cathode-ray tube can occupy any one of 4096x4096 positions. Light from the CRT screen is focused onto the photograph, traverses it, and is then recorded with a photomultiplier. Photograph areas from 3x3 to 1x1 mm^2 or smaller can be scanned. More than 50 FORTRAN programs were written for the experimentation complex. The capabilities of the Zenit unit were adapted for measuring and searching for defects in photomasks of integrated microcircuits, relying on a priori information about possible defects. Special optics made the Zenit unit accessible for direct scanning of microbiological objects. Kinoforms can be synthesized in real time with this same unit, equipped with an argon gas laser for making synthesized phase holograms. The materials in this article were reported at the Soviet-American Seminar on Optical Information Processing, Novosibirsk, 10-16 Jul 76

USSR

UDC 535.4:778.38

KINOFORM LENSES. PART 1. OPTICAL METHOD OF MAKING PHOTOMASKS

Novosibirsk AVTOMETRIYA in Russian No 5, Sep/Oct 77 pp 71-79 manuscript received 10 Feb 77

KORONKEVICH, V. P., LENKOVA, G. A. and MIKHAL'TSOVA, I. A.

[Abstract] Kinoform lenses can be made by an optical method that is not dependent on phase sampling or a scanning process. The negative is prepared in a single exposure, relying on a specialized Fabry-Perot interferometer operating in reflected light. The negative of the kinoform lens is made by projecting Fabry-Perot rings onto a photographic plate. Kinoform lenses are made in two stages. In stage one a negative is prepared on high-resolution holographic plates (photomasks). Photoresist is the material used in this stage. In the second stage, transmission of the photomask in terms of intensity is transformed into corresponding changes in the optical thickness of thick films by change in geometric thickness or index of refraction. Chalcogenide glasslike semiconductor (CGC) is the material used here. Radiation from a helium-neon laser (wavelength 0.6328 microns) is focused onto an 0.01-0.03 mm diameter slit behind which are positioned, in order, a diffuser, interferometer mirrors, beam-splitter and a photographic cassette. An Industar-37 objective lens, f = 300 mm and a Gelios-40 lens, f = 85 mm, are used. Figures 10, tables 1; references 7: 2 Russian, 5 Western.

USSR UDC 002.63

ORGANIZATION OF SCIENTIFIC-INFORMATIONAL ACTIVITY DURING CONSOLIDATION

Moscow NAUCHNO-TEKHNICHESKAYA INFORMATSIYA, SERIYA 1: ORGANIZATSIYA I METODIKA INFORMATSIONNOY RABOTY in Russian No 1, Jan 78 pp 8-15 manuscript received 26 Jul 76

BURYY-SHMAR'YAN, O. YE.

[Abstract] The basic principles of organizing the scientific information service during consolidation with industrial complexes are reviewed and discussed. The three main types of scientific information service are: decentralized, semicentralized, and centralized. Services not undergoing changes during the consolidation process are not considered here. The criteria for determining the organization of each type of service are defined and the effect of reorganization on the various activities is evaluated. A sketchy report is given on five years of experience in organizing and operating a centralized department of scientific-technical and economic information for a scientific-industrial consolidation which took place in three stages: economic feasibility study, preparation and scheduling, staffing and instruction. The cost of such a changeover to a centralized service is analyzed. The activities include data processing for analysis and synthesis, dissemination of scientific-technical information by publication or other means, and maintenance of libraries or data banks. The performance of a service is measured by qualitative and quantitative indicators characterizing these activities as well as by economic indicators characterizing the productivity of the complex after consolidation. Tables 4.

USSR UDC 002.513.5:681.322

A METHOD OF CODING INFORMATION CONTAINED IN BLUEPRINTS AND GRAPHS TO FACILITATE THE DESIGN PROCESS

Minsk IZVESTIYA AKADEMII NAUK BELORUSSKOY SSR, SERIYA FIZIKO-TEKHNICHESKIKH NAUK in Russian No 1, Jan-Mar 78 pp 102-111 manuscript received 25 Aug 77

YARMOSH, N. A. and YAKOVISHIN, V. S., Institute of Engineering Cybernetics, Academy of Sciences of the Belorussian SSR

[Abstract] A language and a system of symbols are proposed for coding information on blueprints and graphs so as to facilitate most effectively and economically the design of parts. These symbols cover all kinds of surfaces, including surfaces of revolution as well as plane surfaces, also sections, profiles, and modifications effected by machining (holes, grooves,

shoulders, etc.). Surface finishes and spatial relations between surfaces are also covered. Complex machining operations are represented by addition or multiplication, as appropriate. The application of this system and its advantages are illustrated here on an intricate rotor shaft. Figures 4; references: 9 Russian.

USSR

A NEW INFORMATION STORAGE AND RETRIEVAL SYSTEM

Moscow SOTSIALISTECHSKAYA INDUSTRIYA in Russian ("'Referat' Informs")
2 Mar 78 p 4

KROKHIN, YU.

[Text] The second version of the "Referat" automated scientific and technical information system has come into operation in the TSNIITEIpriborostroyeniya [Central Scientific-Research Institute of Information and Technical-Economic Research for the Instrument Building Industry]. Created on the foundation of a third-generation computer, it makes it possible to increase the efficiency of processing and retrieving various pieces of information and to give subscribers authentic information--that is, information which is significantly more concrete and specific.

It is hard not to be amazed when one watches how the system's "mechanism" works. Suppose that one of the subscribers, and "Referat" has over 300 of them, asks it by telephone, telegraph, or teletype to retrieve an article from a scientific journal. The request is processed, classified, and input into the computer. And it in turn outputs the address of the required information--the number of the cell with a copy of the document photographed on microfilm. The retrieval device (a special trolley) moves under the control of the computer and obtains the required material from the cell. Then this information is sent by mail to the customer in a form suitable for viewing--a xerographic reproduction or a microfilm.

Soon customers will be able to obtain whole subject divisions of the inquiry-information bank transcribed on magnetic tape. It is planned to organize the exchange of information on magnetic carriers between "Referat" and other industry systems. In the very near future it will be possible to obtain operational information in this way too: it will be possible to make a request by telephone even from another city, and in a few minutes the answer will appear on the screen of a display unit standing in front of the customer.

In the laboratories of the institute work is currently going on to create a holographic memory unit. It will be possible to put out information

from it on a television screen or to copy it onto photographic film. There already is a model prototype of an archival memory unit which uses microholograms.

The experimental stage, which confirmed the correctness of the chosen solutions, is nearing its conclusion. Referat's tomorrow is being born today.

USSR

QUESTIONNAIRE SYSTEM FOR ECONOMIC DATA PROCESSING

Tallin SOVETSKAYA ESTONIYA in Russian 4 May 78 p 2

[Text] A questionnaire system for economic data processing (ASOED) has been completed in the Institute of Cybernetics, Academy of Sciences Estonian SSR for YeS EVM's [electronic computers] (models with no less power than the YeS-1022) and for M-4030 UVK's [control computer complexes]. ASOED is a multipurpose package of applied programs for the development and management of a data base and for automation of tabular planning estimates, accounts and records. The system is intended mainly for higher and middle levels of organizational control of sections of the national economy, but is also used successfully as general-purpose software for ASU's [automatic management system] at the enterprise level.

ASOED was created because the development of ASU's is a lengthy process during which the target of automation itself and the accounting methods are varied. Both this process and also the application of the added experience gained in the process must be managed by economists who must operate the EVM's themselves along with valuable members of their group.

ASOED differs from traditional processing systems in that it is:

Versatile (combining the capabilities of data base control systems, data processing computer systems and account generators);

Oriented toward economicss and nonprogrammers who may project and enter their estimates by means of ASOED and execute them in a direct contact operation with an electronic computer without having to know programming languages;

Easily adaptable to the specifications of any economic targets and accounts.

Operation of the system is accomplished by ordering prepared procedures from it in the required sequence. The ordering is done by loading specific questionnaires (questionnaire orders). All the procedures are consolidated,

that is, they represent completed stages of accounting in complete tables or in series of tables. The basic characteristics of the implementation of more complicated procedures could also be described in terms of the small number of flowcharts for controlling the data (in the form of simple series and tables of numbers). Economists, managers and skilled workers accustomed to working with economic forms (tables) are able to order them with the help of a single unique questionnaire which refers to the questionnaires prepared in the data base and the flowcharts for controlling the data.

Owing to the availability of ASOED to economists, the group of specialists participating in the development of ASU's and obtaining direct access to EVM's is being repeatedly enlarged. With the projection of estimates for economic data processing done by ASOED, technical and operating plans may be consolidated and used as direct entries to ASOED. With planning for the automation of data processing in ASU's using ASOED, approximately a tenfold payoff is gained in outlay for labor on account entry. ASOED also assures a considerable overall economy due to the reduction of both the time for obtaining concrete results in preliminary estimates and the overall time for obtaining useful output from the ASU's developed.

Footnote: An experimental version of ASOED has been developed and adopted on a "Minsk-32" EVM for which the main authors were awarded the Soviet Estoniya Prize in 1975. At the present time, only the basic version of ASOED implemented on DOS [disk operating system] YeS and DOS ASVT [integrated system of calculating techniques] is being distributed.

USSR

RESEARCH APPROVED FOR INSTITUTE OF ELECTRONICS AND COMPUTER TECHNOLOGY

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian ("Regular Meetings of the Presidium of the Academy of Sciences Latvian SSR") No 4, 1978 pp 149-151

[Excerpt] At the session held on 29 December 1977, the Presidium of the Academy of Sciences Latvian SSR listened to a scientific report on "Stochastic Conversion of Information" by I. Ya. Bilinskiy, candidate in technical sciences. In the Institute of Electronics and Computer Technology, research on the creation of new efficient methods and electronic means of coding continuous signals of a diverse physical nature has been conducted successfully since 1968. The Presidium approved the institute's research and development in the field of stochastic conversion of information and recommended that research directed toward the solution of problems on the topic "Multimachine Computer Systems and Networks" be expanded.

HUNGARY

THE MM [MANAGEMENT MODULE] SYSTEM AND ITS REALIZATION ON THE R-10 COMPUTER

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 78-82
manuscript received 9 Nov 77

MOLNAR, MATE, staff scientist, SZAMKI [Computer Applications Research Institute]

[Abstract] The MM system is based on the fact that there are many similar programs for various typical data-processing tasks, e.g. primary-data checking programs, tabulating programs, programs which actualize the basic files, and so forth. Most of the tasks may be classified into groups. The type programs contain the skeleton algorithms characterizing the entire task category. The algorithms of the type programs are then supplemented with auxiliary algorithms which pertain to the specific task only. An AP (adapting parameter) language is used in the MM system for the special features and the algorithm sections. This language is used to describe the parameters needed for the running of the type programs and for writing the user algorithms taking place at certain points of the type-program run. From among the many type programs available, the article describes two: TT4 (processing sequential input files) and UD5 (actualization of stock files). The MM system for the R-10 consists of a 48 kbyte central processor, a console typewriter or operator display, magnetic-disk unit, card reader or perforated tape reader, line printer, and 1-4 magnetic-tape units. The system may be used under the monitoring of any disk monitor (MRSE, ABM, DBM, RTDM, and so forth). Experience during three years of running of the system was satisfactory. References: 4 Hungarian.

HUNGARY

COMPUTER-AIDED CONTROL OF COMPUTERIZED PROBLEM SOLVING

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 105-113
manuscript received 6 Dec 77

NYYRY, GEZA, deputy general director, SZAMKI [Computer Applications Research Institute]

[Abstract] Means for dealing with problems in computerized problem solving are investigated. These problems include the following: because of the increasing complexity of the data-processing systems, processing requires increasingly high-level control, checking, and system service; the need for continuous updating hampers the stability of the operations; the inability of the JCL (job control) languages to control processing operations fully; the increasing complexity of the tasks; and conflicting requirements imposed by

the sequencing strategy of the operating systems for best utilization of the hardware and the strategy of the process for effectiveness. The studies included the automatability of the relations between the input files, output files, and processing programs;modularization and parametric control of the processing steps; computerization of the checking and control of the processing steps; and a dynamic coordination of the power-resource needs of the process handled and the capacities provided by the system. The principle of the solution is to separate the data-processing programs/program systems into modules and computerizing the operations according to the relationships of the individual modules. In addition, use is made of earlier experiences with manual scheduling. Figures 4; tables 1; references 22: 2 Russian, 1 Hungarian, 19 Western.

HUNGARY

DEVELOPMENT OF DATA TELEPROCESSING SYSTEMS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 114-118
manuscript received 12 Nov 77

RAJKI, PETER, deputy senior scientific department head, SZAMKI [Computer Applications Research Institute]

[Abstract] Theoretical and practical solutions for designing and implementing data teleprocessing systems for better utilization of existing computers (including ESER [Unified Computer System] computers) are described. An intelligent concentrator based on the R-10 provides remote job access for Honeywell computers: up to 32 virtual remote job access stations may be handled at the level of the services of the Honeywell 702 terminal. An R-10 based IBM 3270 terminal concentrator system is under development; it will provide, in addition to the services of the IBM 3270, remote job access for ESER/IBM computer centers. There is under development an R-10 based intelligent front end system to permit remote data processing to be performed on large-scale ESER units where both remote job access and special dialog connection are needed. Various model data teleprocessing systems based on the R-10 have been realized. They include the freight-car data-handling system of freight yards in the Soviet Union, using data-acquisition and interrogation terminals, and leased data-transmission lines; a general data-acquisition system (still under development) consisting of basic software and data teleprocessing programs; and a terminal-network system for MAV [Hungarian State Railways] using data-transmission interfaces on a R-10 basis. A survey of user needs is in progress to provide data for further development trends. Figures 8: references: 7 Hungarian.

HUNGARY

FAMILY-NAME STUDIES FOR THE COMPUTERIZATION OF THE POPULATION REGISTRY

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 137-141
manuscript received 18 Nov 77

SZABO, GYULA, staff scientist, SZAMKI [Computer Applications Research Institute]

[Abstract] Hungarian family names were studied with the aim of establishing the kind and extent of data reduction that is feasible prior to the computerization of the population registry operations. Two lists (one of pensioners, including 1.6 million names, and another of a group of male people gathered in the course of a recent census) were used in the study. It was established that it is impracticable to prepare a full registry of Hungarian family names because there are more than 110,000 of them. Significant data compression may be achieved, however, by coding the most frequently encountered family names (22 percent of the population has the 30 most frequently occurring family names). An index-sequential system was set up to handle the data base. It functions well and may be used with high-level programming languages. The goal is ultimately to develop a programming and storage system in which the data concentration is minimum and the file organization is as simple as possible. The program system will be prepared in the parametric form. It uses a relatively simple symbolic language for the determination of record types, data characterizations, basic operations, and output tabulations. Figures 8; references: 7 Hungarian.

HUNGARY

MODERNIZATION OF THE COMPUTERIZED REAL-ESTATE REGISTRY OPERATIONS ON THE BASIS OF THE DATA-BASE TECHNIQUE

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 2, 1978 pp 142-146 manuscript received 9 Nov 77

KERTESZ, JANOS MRS, deputy senior department head, SZAMKI [Computer Applications Research Institute]

[Abstract] The registry operations were based on an IBM 360/40 computer using the batch system and conventional data-processing methods. To modernize the operations, they converted to Interscan 2100 and Honeywell Bull 66/60 computers using an IDS (Integrated Data Store) data-base processing technique, the IDSQ (IDS Query System), and the MDQS (Management Data Query System). No change was made in the input system in order to permit the users to carry on as they did before. The system to be converted

consists of the basic-data subsystem and the data-change registering subsystem. Instead of using punched cards (as with the earlier system), the data will now be recorded in the group data-recording system of the Interscan. However, the new system will have punched-card processing capability also. New basic files were set up. Here the problem was how to enter conventionally organized data into the hierarchically structured IDS files. The procedure was established by trial and error. A suitable loading program system was found. Major efficiency increase is expected from the implementation of the new system. Ultimately terminals in various parts of the country will be used to input data to the center (located at the State Administration Computer Center). Figures 2; tables 2; references 5: 2 Hungarian and 3 Western.

USSR UDC 519.95

MATHEMATICAL MODEL FOR PLOTTING THE COLLOCATION CURVE IN DESIGN AUTOMATION SYSTEMS

Minsk IZVESTIYA AKADEMII NAUK BELORUSSKOY SSR, SERIYA FIZIKO-TEKHNICHESKIKH NAUK in Russian No 1, Jan-Mar 78 pp 96-101 manuscript received 11 Oct 77

SEMENKOV, O. I. and VASIL'YEV, V. P., Institute of Engineering Cybernetics, Academy of Sciences of the Belorussian SSR

[Abstract] A common problem in automating the design of shapes is to construct a curve consisting of segments within a certain smoothness class. The resulting curve is often not as smooth as the segments it joins. This drawback can be overcome by drawing a smooth curve, without inflections, through selected points on the two noncontiguous segments. For automating this process one uses cubic spline functions which describe the curves to be drawn and ensure their fitting smoothness class. Implementation of this method is demonstrated here analytically in rectangular coordinates and then numerically on a typical example involving various possible fits. Figures 4; references: 1 Russian.

USSR UDC 681.3.48./64

PROBLEM OF AUTOMATIC CHECK IN COMPUTERS AND THE CHECK CAPACITY OF POSITIONAL NOTATION SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 pp 71-75 manuscript received 10 Feb 77

BRYUKHOVICH, YEVGENIY IVANOVICH, dr in technical sciences, Cybernetics Institute, Academy of Sciences UkrSSR (Kiev)

[Abstract] Contrary to published judgments stating that Boolean logic and binary arithmetic are inherently incapable of detecting errors appearing in digital computers from component failures or malfunctioning, the automatic control problem can be solved by classical positional notation systems. The characteristics of the check capacity of positional notation systems include checking each numeric bit independently of other bits. This affords a standby effect for rejecting an entire number when an error is detected even in a single bit, regardless of any errors in other bits. Check capacity remains unchanged in each assembly of the numeric channel of a computer no matter what assembly is executing an operation. When an assembly fails to function, a false zero shows up in the number in question. When an assembly operates out of turn, a false one shows up. By assigning positions for the one and for the zero, check is afforded on the validity of each bit because its position is now specified. Error analysis revealed that only three categories of errors can occur in each numerical position in the positional code. The procedural probability of error detection is 1 for detecting errors in categories one, two, and in one of the two modifications of the third error category. Only the second modification of the third error category is undetectable by the method described. Adoption of the method hinges on study of how this representational mode affects the main computer characteristics--operating speed, reliability, power load, complexity of integrated technology, cost and so on. Tables 1; references: 9 Russian.

USSR

UDC 681.327.2.082.5:778.38

MAGNIFICATION DURING REPRODUCTION OF TABULAR IMAGES FROM MICROHOLOGRAMS

Minsk IZVESTIYA AKADEMII NAUK BELORUSSKOY SSR, SERIYA FIZIKO-TEKHNICHESKIKH NAUK in Russian No 1, Jan-Mar 78 pp 88-95 manuscript received 17 Feb 77

YEROKHOVETS, V. K., Institute of Engineering Cybernetics, Academy of Sciences of the Belorussian SSR

[Abstract] The feasibility of reproducing a hologram with a change of scale has so far been examined either from the purely theoretical standpoint without regard to the practical specifics, or with an engineering-experimental approach without sufficient analysis of all aspects. Here a more complete analysis is shown, taking into account the geometry of the objective channel with aberrations as well as the curvature of the wavefront of the coherent light beam--all in relation to the wavelength. The caulculations are based on the distribution of the optical field in various planes within the image space and conversion of integrals to algebraic expressions for the magnification factor. Figures 3; references 9: 1 Russian, 1 Polish, 1 German, 6 Western.

VII. GENERAL INFORMATION

A. Conferences

USSR

CYBERNETICS CONFERENCES AND SYMPOSIUMS

Moscow VESTNIK AKADEMII NAUK SSSR in Russian ("Calendar of Scientific Meetings") No 3, 1978 pp 123-126

[Abstract] The Computer Center of the Siberian Department, Academy of Sciences USSR, will conduct a two-day Conference on Problems of the Development and Introduction of the ASU "Sigma" Automated Management System in Novosibirsk in April.

The IX Symposium on Cybernetics will be held in Sukhumi in May. The three-day symposium is sponsored by the Institute of Cybernetics of the Academy of Sciences Georgian SSR and the Computer Center of the USSR Academy of Sciences.

Riga will be the site of a three-day conference on "Multimachine Systems for Automation of Scientific Research" this April. The sponsors of the conference are: the Institute of Electronics and Computer Technology of the Academy of Sciences Latvian SSR, the Council on Automation of Scientific Research under the USSR Academy of Sciences, and the Scientific Council on the Automation of Scientific Research and Problems of Cybernetics under the Latvian SSR Academy of Sciences.

The VII Conference on the Theory of Coding and Information Transmission will be held for three days this May in the city of Vil'nyus under the auspices of the Scientific Council on the Interdisciplinary Problem "Cybernetics," the Institute of Information Transmission Problems of the Academy of Sciences USSR, and the Lithuanian Republic Board of Directors [pravleniye] of NTORES [Scientific-Technical Society for Radio Engineering, Electronics, and Communications imeni A. S. Popov].

The IV Congerence on Statistical Methods in Control Processes will be held in Frunze in April. Sponsoring organizations of the three-day conference are the Institute of Control Problems, the Institute of Automation of the Academy of Sciences Kirgiz SSR and the Frunze Polytechnical Institute.

The VII Conference on the Theory and Organizational Principles of Robots and Manipulators will be held in Moscow in May. The conference, which will last three days, is being convened by the Scientific Council on the Theory and Organizational Principles of Robots and Manipulators, the Institute of Control Problems, the Institute of Problems of Mechanics of the Academy of Sciences USSR, the State Scientific Research Institute of Machine Science, and the Moscow House of Scientific-Technical Propaganda.

The Seminar "Modeling of Discrete Control and Computer Systems" will be held in Chelyabinsk under the auspices of the Institute of Mathematics and Mechanics of the Ural Scientific Center, Academy of Sciences USSR and the Scientific

Council on the Interdisciplinary Problem "Cybernetics" under the Academy of Sciences USSR. The seninar will be held in May and will continue for three days.

The Scientific Research Computer Center of the Academy of Sciences USSR is holding a Conference "Dialog Resources for Processing and Conversion of Information" in Pushchino this May. The conference will last three days.

Gelendzhik will be the location of the Conference "Underwater Apparatus and Robots" scheduled for April. The three-day conference is being sponsored by the Oceanographic Commission of the Academy of Sciences USSR and the Southern Department of the Institute of Oceanology, Academy of Sciences USSR.

USSR

CONFERENCE ON AUTOMATION OF SCIENTIFIC RESEARCH HELD IN LATVIYA

Riga SOVETSKAYA LATVIYA in Russian ("To Science--Automation") 20 Apr 78 p 1

[Text] There is no doubt that automation is applicable to even such a complex process as scientific research. The practical resolution of this problem was the topic of a conference convened by the Academy of Sciences USSR and the academies of sciences of the union republics, which opened 19 April in the capital city of Soviet Latvia. Prospects for the development of networks of computers and collective-use computer systems in the scientific centers of the USSR are being discussed at the conference. Such systems must ensure control of scientific experiments, processing of their results, and storage and transmission of the necessary information. This will also establish the most favorable conditions for the creative work of the scientists.

The conference was opened by Academician B. N. Petrov, academician-secretary of the Department of Mechanics and Control Processes of the Academy of Sciences USSR.

The first session of the conference was addressed by Academician G. I. Marchuk, vice president of the Academy of Sciences USSR, and Academician V. M. Glushkov, vice president of the Academy of Sciences Ukrainian SSR. The program includes speeches by a number of other well known scientists during the three days the conference will continue.

Participants in the conference also include: I. A. Anderson, secretary of the Central Committee of the Communist Party of Latvia; V. P. Vashchenko, instructor of the Central Committee of the CPSU; M. L. Raman, deputy chairman of the Council of Ministers Latvian SSR and chairman of Gosplan Latvian

SSR; and Ya. I. Mikulan, head of the Division of Science and Educational Institutions of the Central Committee of the Communist Party of Latvia.

USSR

CONFERENCE ON AUTOMATED MANAGEMENT SYSTEMS OPENS IN MOSCOW

Leningrad LENINGRADSKAYA PRAVDA in Russian ("ASU In The National Economy") 16 May 78 p 1

[Abstract] Problems in the utilization of computer resources and automated management systems in the national economy are being discussed at an All-Union conference which opened in Moscow on 15 May.

The conference was opened by Deputy Chairman of the Council of Ministers USSR and Chairman of the GKNT (State Committee for Science and Technology of the Council of Ministers USSR), V. A. Kirillin.

The meeting was attended by Secretaries of the Politburo of the Central Committee CPSU A. P. Kirilenko and M. V. Zimyanin.

During the years 1976-1980, the scale of computer-based automation of production processes should increase more than twofold in comparison with the Ninth Five-Year Plan.

The necessity of implementing the following improvements in this operation were pointed out at the meeting: accelerating the task of providing computer centers with domestically produced third-generation computers; shortening the deadlines for the industrial exploitation of computer technology facilities, and expanding the sphere of their use.

USSR

ALL-UNION CONFERENCE ON ASU IN SOCIAL ORGANIZATIONS HELD IN MOSCOW

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("With the Help of the ASU") 9 Jun 78 p 2

RAZUMKOV, I., chief, publishing sector, All-Union Council of Scientific and Technical Societies (VSNTO)

[Text] The All-Union Scientific-Practical Conference "ASU [automated management system]-Aided Information-Reference Services in Social Organizations" ("ASU-Plant Committee") has begun in Moscow. It has been organized by the State Committee on Science and Technology (GKNT), the All-Union Council of Scientific and Technical Societies (VSNTO), the Scientific Council on the Problems of Socialist Competition of the Academy of Sciences USSR, and the All-Union Central Trade-Union Council (VTsSPS) and its Higher School of the Trade Union Movement.

Conference participants gave a high rating to the first experiment in the social organization's use of the computer in directing socialist competition (Minsk Computer Plant imeni S. Ordzhonike), the elaboration of annual tasks in man-hours (Belgorod Boiler Construction Plant), and the development of systems for the calculation of results of socialist competition (Kommutator Production Association in Riga).

In attendance at the conference were Chairman of the VTsSPS A. I. Shibayev, Secretary of the VTsSPS I. M. Bladychenko, chairman of the VSNTO and academician A. Yu. Ishlinskiy.

B. Organizations

USSR

ACADEMY ESTABLISHES COMPUTER CENTER IN LENINGRAD

Moscow VESTNIK AKADEMII NAUK SSSR in Russian ("Scientific-Organizational Decisions of the Presidium of the Academy of Sciences USSR") No 4, 1978 pp 136-137

[Abstract] The Leningrad Scientific-Resarch Computer Center of the Academy of Sciences USSR has been organized under the Academy's Division of Mechanics and Control Processes, using as a base the Department of Computer Technology of the Physico-Technical Institute imeni A. F. Ioffe. Doctor of Technical Sciences V. M. Ponomarev has been appointed director of the new center, which has the legal status of a scientific-research institute. The Division of Mathematics of the USSR Academy of Sciences is responsible for scientific and procedural guidance of the research carried out at the center which falls within its competency.

The Leningrad Scientific-Research Computer Center is charged with establishing a multilevel collective-use computing and data processing complex; developing methods for automation of scientific research and automation of design and control of experiments based on the foregoing center; and the creation of packages of applied programs, operating systems and methods for automating the programming process for scientific research, design, and control. The center will also carry out computational work for institutes of the Academy of Sciences USSR and assist the Academy's institutes in Leningrad to train specialists in automation of scientific research.

USSR

NEW UNIVERSITY WILL TEACH COMPUTER MATHEMATICS AND THEORETICAL CYBERNETICS

Moscow PRAVDA in Russian ("The Birth of a University") 20 May 78 p 6

SIMUROV, A., correspondent of PRAVDA

[Abstract] A new university has been opened in the city of Grodno in the Belorussian SSR. It will train specialists in computer mathematics and theoretical cybernetics, as well as philology, history, jurisprudence, quantum electronics, optics and spectroscopy. This is the third university to be established in Belorussia and the fifth higher educational institution in the western oblasts of the republic.

C. Personalities

USSR

CYBERNETICISTS ELECTED TO UKRAINIAN ACADEMY OF SCIENCES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian ("Symposia, Conferences, Meetings--New Reinforcement for the Academy of Sciences Ukrainian SSR") No 2, Mar/Apr 78 pp 137-140

[Abstract] New members elected to the Academy of Sciences Ukrainian SSR at the Academy's general meeting on 31 March 1978 included several specialists in cybernetics. Igor' Nikolayevich Kovalenko and Vladimir Il'ich Skurikhin, both from the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR, were elected to active membership in the Academy's Division of Mathematics, Mechanics, and Cybernetics. Another scientist who became an academician or active member of the academy in this division was Boris Borisovich Timofeyev, director of the Institute of Automation and member of the editorial board of the journal UPRAVLYAYUSHCHIYE SISTEMY I MASHINY [Control Systems and Machines]. Ivan Vasil'yevich Sergiyenko was elected a corresponding member of the Division of Mathematics, Mechanics, and Cybernetics, and Aleksandr Aleksandrovich Bakayev was elected a corresponding member of the Division of Economics. Both Sergiyenko and Bakayev work at the Institute of Cybernetics.

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